

Continuous Flexing Industrial Ethernet Cable

Quabbin DataMax® Extreme Industrial Ethernet Cable *

Many industrial applications expose cables to hazards not present in commercial data cabling installations. Although a cable suited for commercial applications may initially work in a harsh industrial environment, it will quickly fail when used in continuous flexing applications. While commercial grade cables may have a low initial product cost, downtime due to premature failure can be avoided by using a cable that is specifically designed and tested for continuous flexing industrial applications.

Commercial Ethernet cables have a tube jacket surrounding the conductor pairs with room within for the pairs to move around and even untwist in flexing applications, resulting in early mechanical or electrical failure of the cable. Quabbin DataMax Extreme Industrial Ethernet cable jackets were developed to survive the many industrial hazards that commercial jackets will not. DataMax Extreme cable jackets are pressure extruded over the cable core, effectively "locking" the conductor pairs in place. This type of jacket construction provides very stable electrical performance, even when the cable is impacted, bent, or repeatedly flexed. Pressure extrusion also provides

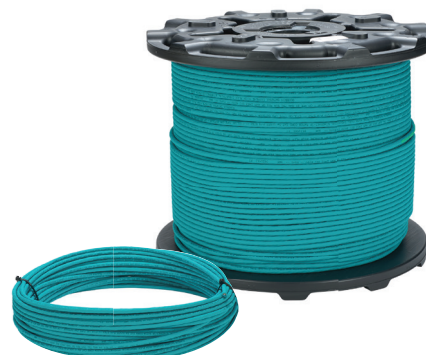
a very smooth, round, and firm jacket profile that is crush resistant and ideal for obtaining a reliable termination and seal when installing connectors.

Quabbin has performed extensive testing on their pressure extruded jacketed DataMax Extreme Industrial Ethernet cables. Samples are subjected to 10 million cycles in a flex testing device that simulates an unsupported bend, simulating a situation the cable would be exposed to on a robotic arm. The unsupported bend test is much more abusive than a C-Track or Tick-tock test, both of which add protection to the cable by supporting the bend. Quabbin DataMax Extreme Industrial Ethernet cable provides superior design and construction that will withstand the rigors of continuous flexing applications and the harsh environments found in industrial installations. Quabbin DataMax Extreme Industrial Ethernet cable performs above industry standards, thereby reducing downtime and increasing productivity. DataMax Extreme Industrial Ethernet cables fully comply with TIA 568-C.2 and TIA 1005 industrial communication specifications and are designed for use in EtherNet/IP™ systems.

Description

AutomationDirect offers Quabbin DataMax Extreme Industrial Ethernet Category 5e (Cat5e) cables in 2 and 4 pair, unshielded and shielded constructions. Conductors are 24AWG twisted pair, 7/32 stranded tinned copper with color coded high density polyethylene insulation. Shielded constructions include both a tinned copper braid shield and aluminized polyester foil overall shield. All constructions feature a pressure extruded Flame Retardant Thermoplastic Elastomer (FR-TPE) jacket with excellent moisture, chemical, UV and weathering resistance, exceptional low-temperature flexibility, and good

flame and fire resistance. Specifically designed and constructed for continuous flexing applications, DataMax Extreme cables have been tested for a minimum of 1 million cycles (10x cable O.D. minimum radius), a minimum of 10 million cycles (20x cable O.D. minimum radius), and a minimum of 3 million cycles torsion test. Agency approvals include UL Type CMX OUTDOOR – CM, and UL AWM Style 2463 (80°C, 600V). The cables are made in the USA and available in 20, 50, 100, 250, and 1000 foot lengths.



Features

- Designed and tested for continuous flexing Industrial Ethernet applications
- In compliance with TIA 568-C.2 Category 5e (Cat5e) and TIA 1005
- Designed for use in EtherNet/IP™ systems **
- 24AWG, 2 or 4 twisted pairs with color coded high density polyethylene insulation
- Unshielded or overall braid and foil shields
- Pressure extruded FR-TPE jacket for excellent chemical, moisture, and flame resistance, and exceptional low temperature flexibility
- Mechanical properties tests include:
 - » minimum of 1 million cycles (10x cable O.D. minimum radius)
 - » minimum of 10 million cycles (20x cable O.D. minimum radius)
 - » minimum of 3 million cycles torsion test
- UL Type CMX OUTDOOR – CM and UL AWM Style 2463 (80°C, 600V)
- 20, 50, 100, 250, and 1000 foot lengths
- Made in the USA

* DataMax is a registered trademark of Quabbin Wire and Cable Corporation.

** EtherNet/IP is a trademark of ODVA, Inc.

Continuous Flexing IE Cable

Continuous Flexing Industrial Ethernet Cable Selection								
Part Number	Wiring Standard	Length	Shield	No. of Pairs	Pair Colors	Description	Weight (lb)	Price
Q5772-20	Cat5e	20ft (6m)	Unshielded	2	Pair 1 - White/Orange & Orange Pair 2 - White/Green & Green	Ethernet cable, 2 twisted pairs, 24 AWG, high density polyethylene conductor insulation material, unshielded, flame retardant thermoplastic elastomer (FR-TPE) jacket, UL cable type CMX Outdoor - CM and AWM style 2463	0.44	
Q5772-50		50ft (15.2 m)					1.10	
Q5772-100		100ft (30.5 m)					2.20	
Q5772-250		250ft (76.2 m)					5.50	
Q5772-1000		1000ft (304.8 m)					22	
Q5752-20		20ft (6m)	Unshielded	4	Pair 1 - White/Blue & Blue Pair 2 - White/Orange & Orange Pair 3 - White/Green & Green Pair 4 - White/Brown & Brown	Ethernet cable, 4 twisted pairs, 24 AWG, high density polyethylene conductor insulation material, unshielded, flame retardant thermoplastic elastomer (FR-TPE) jacket, UL cable type CMX Outdoor - CM and AWM style 2463	0.60	
Q5752-50		50ft (15.2 m)					1.50	
Q5752-100		100ft (30.5 m)					3.0	
Q5752-250		250ft (76.2 m)					7.34	
Q5752-1000		1000ft (304.8 m)					30.0	
Q5025-20		20ft (6m)	Foil and Braid	2	Pair 1 - Orange & White/Orange Pair 2 - Green & White/Green	Ethernet cable, 2 twisted pairs, 24 AWG, high density polyethylene conductor insulation material, overall foil and braid shielded, flame retardant thermoplastic elastomer (FR-TPE) jacket, UL cable type CMX Outdoor - CM and AWM style 2463	0.74	
Q5025-50		50ft (15.2 m)					1.86	
Q5025-100		100ft (30.5 m)					3.71	
Q5025-250		250ft (76.2 m)					9.30	
Q5025-1000		1000ft (304.8 m)					37.10	
Q5090-20		20ft (6m)		4	Pair 1 - Blue & White/Blue Pair 2 - Orange & White/Orange Pair 3 - Green & White/Green Pair 4 - Brown & White/Brown	Ethernet cable, 4 twisted pairs, 24 AWG, high density polyethylene conductor insulation material, overall foil and braid shielded, flame retardant thermoplastic elastomer (FR-TPE) jacket, UL cable type CMX Outdoor - CM and AWM style 2463	0.86	
Q5090-50		50ft (15.2 m)					2.15	
Q5090-100		100ft (30.5 m)					4.30	
Q5090-250		250ft (76.2 m)					10.75	
Q5090-1000		1000ft (304.8 m)					43	

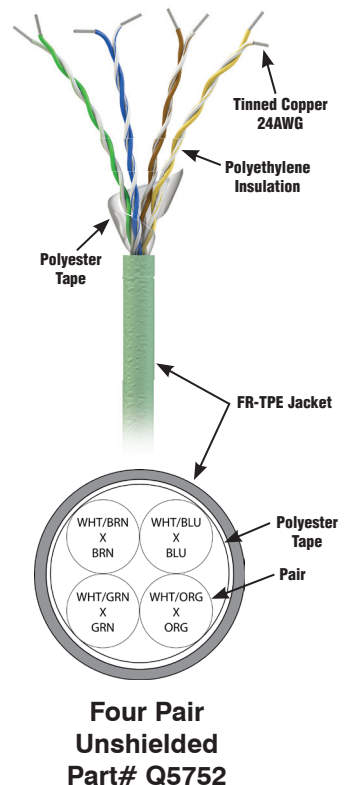
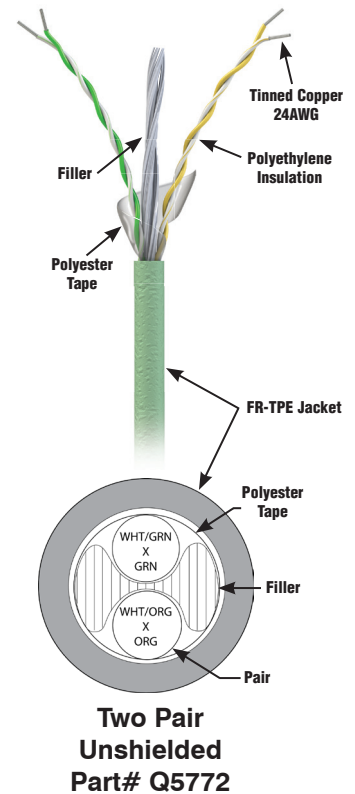
Continuous Flexing IE Cable - Unshielded

Continuous Flexing Unshielded Industrial Ethernet Cable Specifications			
		Physical Properties	
		Q5772 Series	Q5752 Series
Conductor Gauge and Stranding		24 AWG 7/32 stranded tinned copper; 2 twisted pairs	24 AWG 7/32 stranded tinned copper; 4 twisted pairs
Assembly		Individual conductors twisted into pairs, cabled with filler; overall clear polyester tape with pressure extruded jacket	Individual conductors twisted into pairs, cabled; overall polyester clear tape with pressure extruded jacket
Jacket		Teal, Flame Retardant Thermal Plastic Elastomer (FR-TPE), pressure extruded	
Jacket Insulation Thickness		0.032 inch; Nominal	
Shield		Unshielded	
Overall Cable Diameter		0.240 inch; Nominal	0.248 inch; Nominal
Temp/Voltage		80°C (176°F)/600V (AWM 2463)	
Minimum Temperature Rating		-40°C (-40°F)	
Plenum		No	
Sunlight Resistant		Yes per UL 2556	
Minimum Bend Radius		2.4 inch	2.48 inch
Reel/Coil Length		20, 50, 100, 250 or 1000 feet	
Conductor Insulation		High Density Polyethylene (HDPE)	
Color Code	Pair 1	White/Orange & Orange	White/Blue & Blue
	Pair 2	White/Green & Green	White/Orange & Orange
	Pair 3	N/A	White/Green & Green
	Pair 4	N/A	White/Brown & Brown
Bare Conductor		0.024 inch; Nominal	
Conductor Insulation Thickness		0.008 inch; Nominal	
Insulated Conductor Diameter		0.039 inch; Nominal	
Pair Diameter		0.078 inch; Nominal	0.080 inch; Nominal
Cabled Core Diameter		0.176 inch; Nominal	0.184 inch; Nominal
Print Legend		QUABBIN DATAMAX EXTREME HIGH FLEX INDUSTRIAL ETHERNET/IP PATCH CORD CAT5e U/UTP P/N xxxx -- C(UL)US TYPE CMX OUTDOOR - CM 4PR 24 AWG 75C SUN RES OR AWM 2463 80C 600V -- RoHS -- (LOT DESIGNATOR) (SEQUENTIAL FOOTAGE)	
Performance			
Flex Life *		1 million cycles minimum (10x cable O.D. minimum radius) 10 million cycles minimum (20x cable O.D. minimum radius)	
Torsion Test **		3 million cycles minimum	
Cutting Machine Oil Resistance ***		Tensile strength retention 80%; Nominal Elongation retention 100%; Nominal	

* 126 Cycles per minute, @ 20C

** 11lb load, 360 degrees, 71 cycles per minute, @20°C

*** Per Quabbin test report #TR 08-0001



Continuous Flexing IE Cable - Unshielded

Continuous Flexing Unshielded Industrial Ethernet Cable Specifications		
Electrical Characteristics (for 100 meters of cable)		
	Q5772 Series	Q5752 Series
Impedance (1–100 MHz)	100Ω ±15Ω	
Capacitance	13.5 pF/ft Nominal @ 1MHz	
Resistance	26.0 Ω DC, per 1000ft	14.0 Ω DC, per 1000ft
Voltage Rating (max)	600V	
Dielectric Withstand, Min.	2000V RMS	1500V RMS
Return Loss	$1 \leq f < 10 \text{ MHz}$ 20 + 6 LOG (f) dB MIN* $10 \leq f < 20 \text{ MHz}$ 26dB MIN* $20 \leq f \leq 100 \text{ MHz}$ 26 - 5 LOG(f/20) dB MIN*	
Near End Crosstalk (NEXT)	$1 \leq f \leq 100 \text{ MHz}$ 35.3 - 15 LOG(f/100) dB MIN	
Power Sum Near End Crosstalk (PSNEXT)	N/A	$1 \leq f \leq 100 \text{ MHz}$ 32.3 - 15 LOG(f/100) dB MIN
Power Sum Attenuation to Crosstalk Ratio, Far End (PSACRF)	N/A	$1 \leq f \leq 100 \text{ MHz}$ 20.8 - 20 LOG(f/100) dB MIN
Attenuation Crosstalk Ratio, Far End (ACRF)	$1 \leq f \leq 100 \text{ MHz}$ 23.8 - 20 LOG(f/100) dB MIN	
Insertion Loss	$1 \leq f < 100 \text{ MHz}$ $1.2*(1.967 \text{ SQRT}(f) + 0.023(f) + 0.05/\text{SQRT}(f))$ dB Max	
Delay	$1 \leq f \leq 100 \text{ MHz}$ $534 + 36/\sqrt{f}$	
Delay Skew	$1 \leq f < 100 \text{ MHz}$ < 25ns	
Transverse Conversion Loss (TCL)	$1 \leq f < 100 \text{ MHz}$ 30 - 10*LOG(f/100) dB; 40dB Max	$1 \leq f \leq 30 \text{ MHz}$ 73 - 15 Log(f) dB MIN, (40dB MAX)* $30 \leq f \leq 100 \text{ MHz}$ 80.4 - 20 LOG(f) dB MIN
Equal Level Transverse Conversion Transfer Loss (ELTCTL)	$1 \leq f < 30 \text{ MHz}$ >35 - 20*LOG(f/100) dB	$1 \leq f \leq 30 \text{ MHz}$ 50 - 20 LOG(f) dB MIN, (40dB Max)*
Velocity Of Propagation	68%	
Tested Length	P. O. E. Compliant (802.3af) up to 279 feet [85 meters] Meets CAT5e channel requirements up to 279 feet [85 meters]	
UL Classification	Type CMX Outdoor - CM or AWM Style 2463	
Agency Approval	UL E118830 for CMX, CM; UL E69976 for AWM, RoHS Compliant	

* Per ODVA Volume 2 EtherNet/IP

NOTE: All testing conducted off the reel.

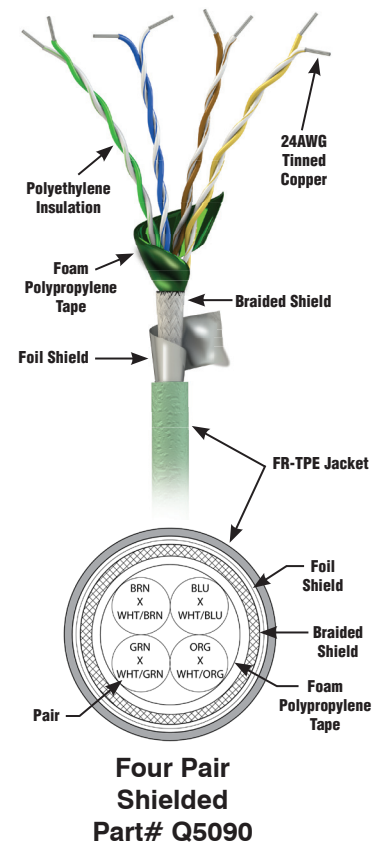
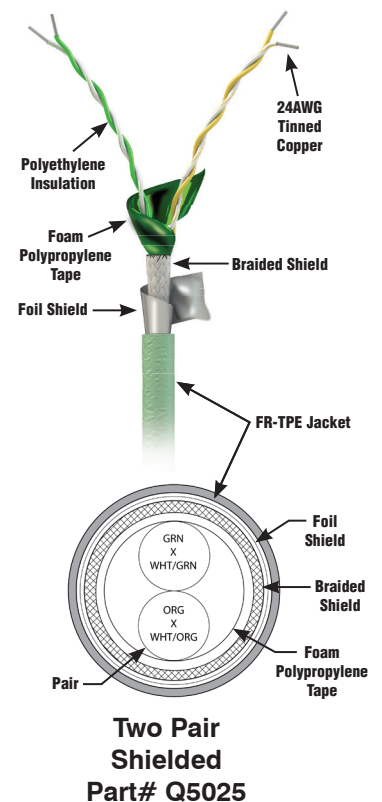
Continuous Flexing IE Cable - Shielded

Continuous Flexing Shielded Industrial Ethernet Cable Specifications			
		Physical Properties	
		Q5025 Series	Q5090 Series
Conductor Gauge and Stranding		24 AWG 7/32 stranded tinned copper; 2 twisted pairs	24 AWG 7/32 stranded tinned copper; 4 twisted pairs
Assembly		Individual conductors twisted into pairs, cabled; overall foil and tinned copper braid shield, overall green foam polypropylene tape with pressure extruded jacket	Individual conductors twisted into pairs, cabled; overall foil and tinned copper braid shield, overall green foam polypropylene tape with pressure extruded jacket
Jacket		Teal, Fire Retardant Thermal Plastic Elastomer (FR-TPE), pressure extruded	
Jacket Insulation Thickness		0.037 inch; Nominal	
Shield		Overall aluminized polyester foil shield 100% coverage & 38 AWG tinned copper braid 75% coverage	
Cable Overall Diameter		0.265 inch; Nominal	0.290 inch; Nominal
Temp/Voltage		80°C (176°F) (AWM 2463)	
Minimum Temperature Rating		-40°C (-40°F)	
Plenum		No	
Sunlight Resistant		Yes, per UL2556	
Minimum Bend Radius		2.65 inch	2.90 inch
Reel/Coil Length		20, 50, 100, 250 or 1000 feet	
Conductor Insulation		High Density Polyethylene (HDPE)	
Color Code	Pair 1	Orange & White/Orange	Blue & White/Blue
	Pair 2	Green & White/Green	Orange & White/Orange
	Pair 3	N/A	Green & White/Green
	Pair 4	N/A	Brown & White/Brown
Bare Conductor Diameter		0.024 inch; Nominal	
Conductor Insulation Thickness		0.011 inch; Nominal	
Insulated Conductor Diameter		0.047 inch; Nominal	
Pair Diameter		0.092 inch; Nominal	
Cabled Core Diameter		0.160 inch; Nominal	0.197 inch; Nominal
Shield + Cabled Core Diameter		0.191 inch; Nominal	0.216 inch; Nominal
Print Legend		QUABBIN DATAMAX EXTREME HIGH FLEX INDUSTRIAL ETHERNET/IP PATCH CORD CAT5e SF/UTP P/N P/N xxxx -- C(UL)US TYPE CMX OUTDOOR - CM 4PR 24 AWG 75C SUN RES OR AWM 2463 80C 600V -- RoHS -- (LOT DESIGNATOR) (SEQUENTIAL FOOTAGE)	
		Performance	
Flex Life *	1 million cycles minimum (10x cable O.D. minimum radius)		
	12.25 million cycles minimum (20x cable O.D. minimum radius)		10 million cycles minimum (20x cable O.D. minimum radius)
Torsion Test**		3 million cycles minimum	
Cutting/ Machine Oil Resistance ***		Tensile strength retention 80%; Nominal Elongation retention 100%; Nominal	

* 126 Cycles per minute, @ 20°C

** 11b load, 360 degrees, 71 cycles per minute, @20C

*** Per Quabbin test report #TR 08-0001



Continuous Flexing IE Cable - Shielded

Continuous Flexing Shielded Industrial Ethernet Cable Specifications		
Electrical Characteristics (for 100 meters of cable)		
	Q5025 Series	Q5090 Series
Impedance (1-100 MHz)	100Ω ±15Ω	
Impedance, Smoothed	100 ±10 Ω TYPICAL 5 ≤ f ≤ 100 MHz	100 ± 20 Ω TYPICAL 5–100 MHz
Capacitance	12.8 pF/ft @ 1MHz; Nominal	13.5 pF/ft @ 1MHz; Nominal
Resistance (max)	26.5 Ω DC per 1000ft @ 20°C (68°F)	14.0 Ω DC per 1000ft
Voltage Rating (max)	600V	
Dielectric Withstand, Min.	2000V RMS	
Return Loss	$1 \leq f < 10 \text{ MHz}$ 20 + 6 LOG (f) dB MIN* $10 \leq f < 20 \text{ MHz}$ 26 dB MIN* $20 \leq f \leq 100 \text{ MHz}$ 26 - 5 LOG(f/20) dB MIN*	
Near End Crosstalk (NEXT)	$1 \leq f \leq 100 \text{ MHz}$ 35.3 - 15 LOG(f/100) dB MIN	
Power Sum Near End Crosstalk (PSNEXT)	N/A	$1 \leq f \leq 100 \text{ MHz}$ 32.3 - 15 LOG(f/100) dB MIN
Power Sum Attenuation to Crosstalk Ratio, Far End (PSACRF)	N/A	$1 \leq f \leq 100 \text{ MHz}$ 20.8 - 20 LOG(f/100) dB MIN
Attenuation Crosstalk Ratio, Far End (ACRF)	$1 \leq f \leq 100 \text{ MHz}$ 23.8 - 20 LOG(f/100) dB MIN	
Insertion Loss	$1 \leq f \leq 100 \text{ MHz}$ $1.2 * [1.967 \sqrt{f} + 0.023(f) + 0.050/\sqrt{f}] \text{ dB MAX}$	
Delay	$1 \leq f \leq 100 \text{ MHz}$ 534 + 36/√f ns Max	
Delay Skew	$1 \leq f \leq 100 \text{ MHz}$ <25ns	
Coupling Attenuation Per IEC 62153-4-9	$30 \leq f \leq 100 \text{ MHz}$ 50dB MIN	$30 \leq f \leq 100 \text{ MHz}$ ≥ 60dB E3* Segregation class d acc. EN 50174-2
Velocity Of Propagation	68%	
UL Classification	Type CMX Outdoor - CM or AWM Style 2463	
Tested Length	P. O. E. Compliant (802.3af) up to 279 feet [85 meters] Meets CAT5e channel requirements up to 279 feet [85 meters]	
Agency Approvals	UL E118830 for CMX, CM; UL E69976 for AWM, RoHS Compliant	

* Per ODVA Volume 2 EtherNet/IP

NOTE: All testing conducted off the reel.