Detailed Specifications & Technical Data

ENGLISH MEASUREMENT VERSION

7928A Multi-Conductor - Category 5e DataTuff® Twisted Pair Cable

Description:

24 AWG Bonded-Pair solid bare copper conductors, FEP insulation, sunlight-, oil- and gas-resistant FEP jacket. Sequential marking at two foot intervals.

Usage (Overall)

Suitable Applications: Industrial Ethernet Cable, Harsh Environments, 350MHz Enhanced Category 5e, Gigabit Ethernet, 100BaseTX, 100BaseVG ANYLAN, 155ATM, 622ATM, NTSC/PAL Component or Composite Video, AES/EBU Digital Audio, AES51, RS-422, RJ-45 Compatible, High and Low Temperature, Oil and Gasoline Exposure, Limited Combustible FHC 25/50

Physical Characteristics (Overall)

Conductor

AWG:

# Pairs	AWG	Stranding	Conductor Material	Dia. (in.)
4	24	Solid	BC - Bare Copper	.020

Insulation

Insulation Material:

Insulation Material	Wall Thickness (in.)
FEP - Fluorinated Ethylene Propylene	.008

Outer Shield

Outer Shield Material:

Outer Shield Material
Unshielded

Outer Jacket

Outer Jacket Material:

Outer Jacket Material
FEP - Fluorinated Ethylene Propylene

Overall Cabling

Overall Nominal Diameter: 0.187 in.

Pair

Pair Color Code Chart:

Number	Color
1	White/Blue Stripe & Blue
2	White/Orange Stripe & Orange
3	White/Green Stripe & Green
4	White/Brown Stripe & Brown

Mechanical Characteristics (Overall)

Installation Temperature Range:	-55°C To +150°C
Operating Temperature Range:	-70°C To +150°C
Bulk Cable Weight:	25 lbs/1000 ft.
Max. Recommended Pulling Tension:	40 lbs.
Min. Bend Radius (Install)/Minor Axis:	0.250 in.

Applicable Specifications and Agency Compliance (Overall)

Applicable Standards & Environmental Programs

NEC/(UL) Specification:	CMP, UL444, FHC 25/50
NEC Articles:	NFPA 259
CEC/C(UL) Specification:	CMP
Other Standards:	11801 Category 5
EU Directive 2000/53/EC (ELV):	Yes
EU Directive 2002/95/EC (RoHS):	Yes
EU RoHS Compliance Date (mm/dd/yyyy):	04/01/2005
EU Directive 2002/96/EC (WEEE):	Yes
EU Directive 2003/11/EC (BFR):	Yes
CA Prop 65 (CJ for Wire & Cable):	Yes
MII Order #39 (China RoHS):	Yes
Telecommunications Standards:	568-B.2 Category 5e
Other Specification:	NEMA WC-63.1 Category 5e, UL verified to Category 5e, Ethernet/IP™ Compliant

Flame Test

UL Flame Test:	UL723 (NFPA 255), NFPA 262
CSA Flame Test:	FT6

Plenum/Non-Plenum

Plenum (Y/N):	Yes

Electrical Characteristics (Overall)

Nom. Mutual Capacitance:

Capacitance (pF/ft)
15

Nominal Velocity of Propagation:

VP (%)
72

Maximum Capacitance Unbalance (pF/100 m):	66

Maximum Delay:

Delay (ns/100 m)
510

Max. Delay Skew:

Delay Skew (ns/100 m)
25

Maximum Conductor DC Resistance:

DCR @ 20°C (Ohm/100 m)
9

Max. Operating Voltage - UL:

Voltage
300 V RMS

Maximum DCR Unbalanced:

DCR Unbalance @ 20°C (%)
3

Electrical Characteristics-Premise (Overall)

Premise Cable Electrical Table 1:

Freq. (MHz)	Max. Attenuation (dB/100 m)	Min. NEXT (dB)	Min. PSNEXT (dB)	Min. ACR (dB)	Min. PSACR (dB)	Min RL (dB)
1	2.0	65.3	65.3	63.3	63.3	20.0
4	4.0	56.3	56.3	52.3	52.3	23.6
8	5.7	51.8	51.8	46.1	46.1	25.4
10	6.4	50.3	50.3	43.9	43.9	26.0
16	8.1	47.3	47.3	39.1	39.1	26.0
20	9.2	45.8	45.8	35.2	35.2	26.0
25	10.3	44.3	44.3	34.1	34.1	25.5
31.25	11.6	42.9	42.9	31.3	31.3	25.0
62.5	16.8	38.4	38.4	21.6	21.6	23.5
100	21.7	35.3	35.3	17.1	17.1	22.5
155	27.7	32.5	32.5	4.7	4.7	19.0
200	32.0	30.8	30.8	3.0	3.0	19.0
250	36.4	29.3	29.3	>0	>0	18.0
300	40.5	28.2	28.2	>0	>0	18.0
310	41.3	27.9	27.9			18.0
350	44.3	27.2	27.2			17.0

Premise Cable Electrical Table 2:

Freq. (MHz)	Input (Unfitted) Imp. (Ohms)	Fitted Impedance	Min. ELFEXT (dB)	Min. PSELFEXT (dB)
1	100 ± 12	95-110	63.8	60.8
4	100 ± 12	95-110	51.7	48.7
8	100 ± 12	95-107	45.7	42.7
10	100 ± 12	95-107	43.8	40.8
16	100 ± 12	95-107	39.7	36.7
20	100 ± 12	95-107	37.7	34.7
25	100 ± 15	95-107	35.8	32.8
31.25	100 ± 15	95-107	33.9	30.9
62.5	100 ± 15	95-107	27.8	24.8
100	100 ± 15	95-107	23.8	20.8
155	100 ± 18	100 ± 10	19.9	16.9
200	100 ± 20	100 ± 10	17.7	14.7
250	100 ± 20	100 ± 10	15.8	12.8
300	100 ± 20	100 ± 10	14.2	11.2
310	100 ± 20	100 ± 10	13.9	10.9
350	100 ± 22	100 ± 10	12.9	9.9

Notes (Overall)

Notes: US Patent #'s 5, 606, 151; 5, 734, 126. EtherNet IP is a trademark of ControlNet International, Ltd. under license by Open DeviceNet Vendor Association, Inc. Operating temperatures are subject to length de-rating. Cable passes -70C Cold Bend per UL 1581.

Put Ups and Colors:

Item #	Putup	Ship Weight	Color	Notes	Item Desc
7928A 0101000	1,000 FT	24.000 LB	BLACK		4 PR #24 FEP FEP

Industrial Data Solutions® — Industrial Ethernet

DataTuff® Twisted Pair and TrayOptic® Fiber Optic Cables Overview

The reliability of your industrial Ethernet network depends on the cable infrastructure. Data transmission errors can lead to interruptions in critical control functions resulting in lost production time and even safety issues. Belden's family of industrial Ethernet cables is designed to withstand the rigors of industrial environments. Whether it's exposure to oil and sunlight, temperature variation, abrasion and crushing, or the presence of electromagnetic interference (EMI) or radio frequency interference (RFI), turn to Belden for the solution.

Belden offers an extensive line of high performance cables in both copper constructions with DataTuff cables as well as fiber optic designs with TrayOptic cables.

Performance Assurance from Blue Hose® to Industrial Ethernet

To assist you in achieving optimum network performance, Belden has built quality and reliability into each cable it manufactures. Decades of leadership and experience in supplying reliable high-end cable solutions, such as Blue Hose®, to industrial networks and control systems are combined to give you industrial Ethernet cables that perform to maximum network capability.

Our dedication to quality manufacturing practices and processes assures consistent products of uncompromising quality.

Installable Performance® with Patented Bonded-Pair Technology

Belden's Bonded-Pair versions of DataTuff cables are unique in the industry to give you an Installable Performance advantage. This patented design yields superior electrical performance even after the effects and stresses of pulling, twisting and bending during typical installations.

This performance advantage is achieved by bonding the individual insulated conductors along their longitudinal axes, resulting in uniform conductor-to-conductor spacing and the elimination of gaps between conductors that can occur during installation. This is a critical construction feature because non-uniform conductor spacing and gaps change the physical characteristics of the cable such that the electrical performance of the cable suffers. Only Bonded-Pair cables deliver the electrical integrity you demand.

TrayOptic Cables

Belden® TrayOptic cables are a line of indoor/outdoor fiber optic cables designed to meet the demanding requirements of industrial applications. When the installation demands the combination of sophisticated fiber optic technology and rugged durability, turn to Belden.

DataTuff® Industrial Ethernet Cable Selection Guide

	Part No.	No. of Pairs	Shielding		Conductor		Installation		Environmental Issues						Industrial Grade Jacket		
			Unshielded	Shielded *	Solid	Stranded **	Installation Stress Resistance†	Pull Tension	Oil Resistance	UV Sunlight Resistance	CMX/ Outdoor	Under-ground (burial)	Gasoline Resistance	Hi/Lo Temp	Heavy	Upjacket	Armored
	Category 5e Cable																
new	**7932A** EtherNet/IP	2	●		●		●	20	●	●					●		
new	**7933A** EtherNet/IP	2		●	●		●	20	●	●					●		
	7923A EtherNet/IP	4	●		●		●	40	●	●	●				●		
	7918A	4	●		●			35	●	●	●				●		
	7924A	4	●			●	●	40	●	●	●				●		
new	**7930A**	4	●			●		25	●	●	●				●		
new	**7922A** PLTC	4	●		●		●	40	●	●	●				●		
new	**7934A** EtherNet/IP	4	●		●		●	40		●		●			●		
	7928A EtherNet/IP	4	●		●		●	40	●	●			●	●	●		
	11700A EtherNet/IP	4	●		●		●	40	●	●	●					●	
new	**11700A2** Oil Res I&II	4	●		●		●	40	●	●						●	
	121700A	4	●		●		●	40	●	●							●
new	**121700R**	4	●		●		●	40	●	●							●
	7929A	4		●	●		●	35	●	●	●				●		
	7919A	4		●	●			25	●	●	●				●		
	7921A EtherNet/IP	4		●	●		●	75	●	●	●				●		
	Category 6 Cable																
	7927A	4	●		●		●	45	●	●					●		
	7931A	4	●		●		●	40	●	●			●	●	●		
	11872A	4	●		●		●	45								●	
	121872A	4	●		●		●	45	●	●							●

*Shielded products are recommended for high-noise environments. **Stranded products are recommended where more flexibility is needed.
†Products with Bonded-Pair technology provide Installable Performance® advantages — refer to Belden's Bonded-Pair Cable Bulletin #BP02

EtherNet/IP is a trademark of ControlNet International, Ltd. under license by Open DeviceNet Vendor Association, Inc.

Industrial Data Solutions® — Industrial Ethernet

Category 5e DataTuff® Twisted Pair Cables, 2-Pair and 4-Pair Heavy-Duty Sunlight and Oil-Resistant Jackets

Description	Part No.	UL NEC/ C(UL) CEC Type	No. of Pairs	Standard Lengths		Standard Unit Wt.		Nominal OD		Freq. (MHz)	Max. Atten. (dB/ 100m)	Min. PSUM NEXT (dB)	Min. PSUM ACR (dB/ 100m)	Min. PSUM ELFEXT (dB/ 100m)	Input Imped. (Ω)	Min. RL (dB)
				Ft.	m	Lbs.	kg	Inch	mm							
Enhanced Cat 5e • 24 AWG Bonded-Pairs Solid BC Conductors • Rip Cord • See Color Codes below																
Polyolefin Insulation • .030″ Industrial Grade Sunlight- and Oil-resistant PVC Jacket (Black, Red or Teal)																
EtherNet/IP Compliant	7932A (new)	NEC: CMR CEC: CMR FT4	2	1000	304.8	19.0	8.61	.207	5.26	1	2.0	65.3	63.3	60.8	100±12	20.0
				2000 ▲	609.6	38.0	17.24			4	4.0	56.3	52.3	48.7	100±12	23.6
										8	5.7	51.8	46.1	42.7	100±12	25.4
										10	6.4	50.3	43.9	40.8	100±12	26.0
										16	8.1	47.3	39.1	36.7	100±12	26.0
										25	10.3	44.3	34.1	32.8	100±15	25.5
										31.25	11.6	42.9	31.3	30.9	100±15	25.0
										62.5	16.8	38.4	21.6	24.8	100±15	23.5
										100	21.7	35.3	17.1	20.8	100±15	22.5
										155	27.7	32.5	4.7	16.9	100±18	19.0
										200	32.0	30.8	3.0	14.7	100±20	19.0
										250	36.4	29.3	—	12.8	100±20	18.0
										350	44.3	27.2	—	9.9	100±22	17.0
Rip Cord																
▲2000 ft. put-up available in Black only. • M-12 or RJ-45 Compatible • Jacket sequentially marked at 2 ft. intervals Cable passes -40°C Cold Bend per UL1581 • Installation Temperature: -25°C to +75°C • Operating Temperature: -40°C to +75°C** Third party verified to TIA/EIA-568-B.2, Category 5e • U.S. Patents 5,606,151 and 5,734,126																
EtherNet/IP Compliant	7923A	NEC: CMR, CMX-Outdoor CEC: CMR FT4	4	1000	304.8	28.0	12.7	.230	5.84	1	2.0	65.3	63.3	60.8	100±12	20.0
				2000 ▲	609.6	54.0	24.5			4	4.0	56.3	52.3	48.7	100±12	23.6
										8	5.7	51.8	46.1	42.7	100±12	25.4
										10	6.4	50.3	43.9	40.8	100±12	26.0
										16	8.1	47.3	39.1	36.7	100±12	26.0
										25	10.3	44.3	34.1	32.8	100±15	25.5
										31.25	11.6	42.9	31.3	30.9	100±15	25.0
										62.5	16.8	38.4	21.6	24.8	100±15	23.5
										100	21.7	35.3	17.1	20.8	100±15	22.5
										155	27.7	32.5	4.7	16.9	100±18	19.0
										200	32.0	30.8	3.0	14.7	100±20	19.0
										250	36.4	29.3	—	12.8	100±20	18.0
										350	44.3	27.2	—	9.9	100±22	17.0
Rip Cord																
▲2000 ft. put-up available in Black only. • RJ-45 Compatible • Jacket sequentially marked at 2 ft. intervals Cable passes -40°C Cold Bend per UL1581• Installation Temperature: -25°C to +75°C • Operating Temperature: -40°C to +75°C** Third party verified to TIA/EIA-568-B.2, Category 5e • U.S. Patents 5,606,151 and 5,734,126 • P-07-KA060003-MSHA*																
Polyolefin Insulation • Waterblocked Sunlight- and Oil-resistant Black Polyethylene Jacket																
EtherNet/IP Compliant **Halogen-Free** **Burial**	7934A (new)	—	4	1000	304.8	25.0	11.34	.230	5.84	1	2.0	62.3	60.0	60.8	100±15	20.0
										4	4.1	53.3	49.0	48.7	100±15	23.6
										8	5.8	48.8	43.0	42.7	100±15	25.4
										10	6.5	47.3	41.0	40.8	100±15	26.0
										16	8.2	44.3	36.0	36.7	100±15	26.0
										20	9.3	42.8	33.5	34.7	100±15	26.0
										25	10.4	41.3	30.9	32.8	100±15	25.5
										31.25	11.7	39.9	28.0	30.9	100±15	25.0
										62.5	17.0	35.4	19.0	24.8	100±15	23.5
										100	22.0	32.3	11.0	20.8	100±15	22.5
										155	28.1	29.5	1.4	16.9	100±25	15.8
										200	32.0	27.8	1.0	14.7	100±25	15.0
RJ-45 Compatible • Jacket sequentially marked at 3 ft. intervals Cable passes -40°C Cold Bend per UL1581 • Installation Temperature: -25°C to +75°C • Operating Temperature: -40°C to +75°C** Third party verified to TIA/EIA-568-B.2, Category 5e • U.S. Patents 5,606,151 and 5,734,126 • Waterblocked per Telcordia, IEC and ICEA																
Plenum • FEP Insulation • Sunlight-, Oil- and Gas-resistant Black FEP Jacket																
EtherNet/IP Compliant **High & Low Temp** **Oil Res I & II** **Gas Res**	7928A	NEC: Limited Combustible FHC 25/50 CMP CEC: CMP FT6	4	1000	304.8	24.0	10.9	.187	4.75	1	2.0	65.3	63.3	60.8	100±12	20.0
										4	4.0	56.3	52.3	48.7	100±12	23.6
										8	5.7	51.8	46.1	42.7	100±12	25.4
										10	6.4	50.3	43.9	40.8	100±12	26.0
										16	8.1	47.3	39.1	36.7	100±12	26.0
										25	10.3	44.3	34.1	32.8	100±15	25.5
										31.25	11.6	42.9	31.3	30.9	100±15	25.0
										62.5	16.8	38.4	21.6	24.8	100±15	23.5
										100	21.7	35.3	17.1	20.8	100±15	22.5
										155	27.7	32.5	4.7	16.9	100±18	19.0
										200	32.0	30.8	3.0	14.7	100±20	19.0
										250	36.4	29.3	—	12.8	100±20	18.0
										350	44.3	27.2	—	9.9	100±22	17.0
RJ-45 Compatible Cable passes -70°C Cold Bend per UL1581 • Installation Temperature: -55°C to +150°C • Operating Temperature: -70°C to +150°C** Jacket sequentially marked at 2 ft. intervals • Third party verified to TIA/EIA-568-B.2, Category 5e • U.S. Patents 5,606,151 and 5,734,126																
Polyolefin Insulation • PVC Inner Jacket • .035″ Industrial Grade PVC Outer Jacket (Black, Gray, Red, Teal or Blue)																
EtherNet/IP Compliant **Upjacketed**	11700A	NEC: CMR, CMX-Outdoor CEC: CMR FT4	4	1000	304.8	39.0	17.7	.285	7.24	1	2.0	65.3	63.3	60.8	100±12	20.0
				3000 †	914.4	117.0	53.2			4	4.0	56.3	52.3	48.7	100±12	23.6
								Nominal		8	5.7	51.8	46.1	42.7	100±12	25.4
								Core OD:		10	6.4	50.3	43.9	40.8	100±12	26.0
								.200	5.08	16	8.1	47.3	39.1	36.7	100±12	26.0
										25	10.3	44.3	34.1	32.8	100±15	25.5
										31.25	11.6	42.9	31.3	30.9	100±15	25.0
										62.5	16.8	38.4	21.6	24.8	100±15	23.5
										100	21.7	35.3	17.1	20.8	100±15	22.5
										155	27.7	32.5	4.7	16.9	100±18	19.0
										200	32.0	30.8	3.0	14.7	100±20	19.0
										250	36.4	29.3	—	12.8	100±20	18.0
										350	44.3	27.2	—	9.9	100±22	17.0
Rip Cords																
†3000 ft. put-up available in Black only. • Outer jacket is sunlight- and oil-resistant. • Jacket sequentially marked at 2 ft. intervals Cable passes -40°C Cold Bend per UL1581 • Installation Temperature: -25°C to +75°C • Operating Temperature: -40°C to +75°C** RJ-45 Compatible • Third party verified to TIA/EIA-568-B.2, Category 5e • U.S. Patents 5,606,151 and 5,734,126 • P-07-KA060005-MSHA*																
Oil Res I & II **Upjacketed**	11700A2 (new)	NEC: CMR CEC: CMR FT4	4	1000 ††	304.8	42.0	19.1	.285	7.24	1	2.0	65.3	63.3	60.8	100±12	20.0
				2000 ††	609.6	86.0	39.1			4	4.0	56.3	52.3	48.7	100±12	23.0
								Nominal		8	5.7	51.8	46.1	42.7	100±12	24.5
								Core OD:		10	6.4	50.3	43.9	40.8	100±12	25.0
								.200	5.08	16	8.1	47.3	39.1	36.7	100±12	25.0
										25	10.3	44.3	34.1	32.8	100±15	24.3
										31.25	11.6	42.9	31.3	30.9	100±15	23.6
										62.5	16.8	38.4	21.6	24.8	100±15	21.5
										100	21.7	35.3	17.1	20.8	100±15	20.1
										155	27.7	32.5	4.7	16.9	100±18	19.0
										200	32.0	30.8	3.0	14.7	100±20	19.0
										250	36.4	29.3	—	12.8	100±20	18.0
										350	44.3	27.2	—	9.9	100±22	17.0
Rip Cord																
††1000 ft. put-up available in Black or Blue only, 2000 ft. put-up in Black only. • RJ-45 Compatible • Outer jacket is sunlight resistant. Cable passes -10°C Cold Bend per UL1581 • Installation Temperature: +5°C to +75°C • Operating Temperature: -10°C to +75°C** Jacket sequentially marked at 2 ft. intervals • Third party verified to TIA/EIA-568-B.2, Category 5e • U.S. Patents 5,606,151 and 5,734,126																

ACR = Attenuation Crosstalk Ratio • BC = Bare Copper • ELFEXT = Equal Level Far-end Crosstalk • NEXT = Near-end Crosstalk • PSUM = Power Sum • RL = Return Loss • TC = Tinned Copper

*Pennsylvania Department of Environmental Resources and United States Mine Safety and Health Administration Certification.
**Subject to length de-rating.

EtherNet/IP is a trademark of ControlNet International, Ltd. under license by Open DeviceNet Vendor Association, Inc.

DataTuff Color Codes: **Pair 1** = White/Blue Stripe & Blue, **Pair 2** = White/Orange Stripe & Orange, **Pair 3** = White/Green Stripe & Green, **Pair 4** = White/Brown Stripe & Brown
For two pair products: use color codes for Pairs 2 & 3

BELDEN