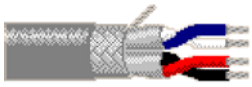
Detailed Specifications & Technical Data

ENGLISH MEASUREMENT VERSION

7896A Multi-Conductor - DeviceBus® for ODVA DeviceNet™



Description:

16 and 18 AWG stranded tinned copper conductors, PVC/Nylon insulation (power), F-R Polypropylene insulation (data), individually foil shielded (100% coverage) plus an overall tinned copper braid (65% coverage, sunlight/oil-resistant PVC jacket.

Physical Characteristics (Overall)

Conductor

AWG:

# Pairs	AWG	Stranding	Conductor Material
1	16	19x29	TC - Tinned Copper
1	18	19x30	TC - Tinned Copper

Insulation

Insulation Material:

Insulation Material	AWG
PVC/Nylon - Polyvinyl Chloride/Nylon	16
FRPP - Flame Retardant Polypropylene	18

Inner Shield

Inner Shield Material:

Layer #	Inner Shield Trade Name	Type	Inner Shield Material	Coverage (%)
16 AWG Pair	Beldfoil®	Tape	Aluminum Foil-Polyester Tape	100
18 AWG Pair	Beldfoil®	Tape	Aluminum Foil-Polyester Tape	100

Outer Shield

Outer Shield Material:

Type	Outer Shield Material	Coverage (%)
Braid	TC - Tinned Copper	65

Outer Shield Drain Wire AWG:

AWG	Stranding	Drain Wire Conductor Material
16	19x29	TC - Tinned Copper

Outer Jacket

Outer Jacket Material:

Outer Jacket Material	Nom. Wall Thickness (in.)
PVC - Polyvinyl Chloride	.060

Overall Cabling

Overall Nominal Diameter:	0.525 in.

Pair

Pair Color Code Chart:

Number	Color
1 (16 AWG)	Red & Black
2 (18 AWG)	Blue & White

Mechanical Characteristics (Overall)

Operating Temperature Range:	-20°C To +75°C
Non-UL Temperature Rating:	75°C

Bulk Cable Weight:	135 lbs/1000 ft.
Max. Recommended Pulling Tension:	190 lbs.
Min. Bend Radius (Install)/Minor Axis:	5 in.

Applicable Specifications and Agency Compliance (Overall)

Applicable Standards & Environmental Programs

NEC/(UL) Specification:	TC-ER
CSA Specification:	I/II A/B
EU CE Mark:	Yes
EU Directive 2000/53/EC (ELV):	Yes
EU Directive 2002/95/EC (RoHS):	Yes
EU RoHS Compliance Date (mm/dd/yyyy):	10/13/2005
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
Other Specification:	ODVA Cable V

Flame Test

UL Flame Test:	UL1685 UL Loading
CSA Flame Test:	FT1

Suitability

Sunlight Resistance:	Yes
Oil Resistance:	Yes

Plenum/Non-Plenum

Plenum (Y/N):	No

Electrical Characteristics (Overall)

Unaveraged Impedance:

Description	Freq. (MHz)	Start Freq. (MHz)	Stop Freq. (MHz)	Impedance (Ohm)
18 AWG Pair Only	.5			120

Nom. Capacitance Conductor to Conductor:

Description	Freq. (MHz)	Start Freq. (MHz)	Stop Freq. (MHz)	Capacitance (pF/ft)
18 AWG Pair Only	1			14.7

Nominal Velocity of Propagation:

Description	VP (%)
18 AWG Pair Only	64

Maximum Delay:

Description	Freq. (MHz)	Start Freq. (MHz)	Stop Freq. (MHz)	Delay (ns/ft)
18 AWG Pair Only				1.6

Nom. Conductor DC Resistance:

Description	DCR @ 20°C (Ohm/1000 ft)
16 AWG	4.9
18 AWG	6.9

Nominal Outer Shield DC Resistance:

DCR @ 20°C (Ohm/1000 ft)
1.8

Max. Attenuation:

()	Description	Freq. (MHz)
.13	18 AWG Pair Only	.125

.25		.500
.40		1.00

Max. Operating Voltage - UL:

Voltage
600 V RMS

Max. Recommended Current:

Description	Current
15 AWG	8.0 Amps per conductor at 25°C

Notes (Overall)

Notes: Meter marks on jacket to aid users in installation. ODVA DeviceNet is an Open DeviceNet Vendor Association, Inc. trademark.

Put Ups and Colors:

Item #	Putup	Ship Weight	Color	Notes	Item Desc
7896A T5U1000	1,000 FT	168.000 LB	GRAY T5U	C	2 #16 PVC/NYL,2#18 FRPP SH PVC
7896A T5U2000	2,000 FT	340.000 LB	GRAY T5U	C	2 #16 PVC/NYL,2#18 FRPP SH PVC
7896A T5U500	500 FT	89.000 LB	GRAY T5U	C	2 #16 PVC/NYL,2#18 FRPP SH PVC

Notes:
C = CRATE REEL PUT-UP.

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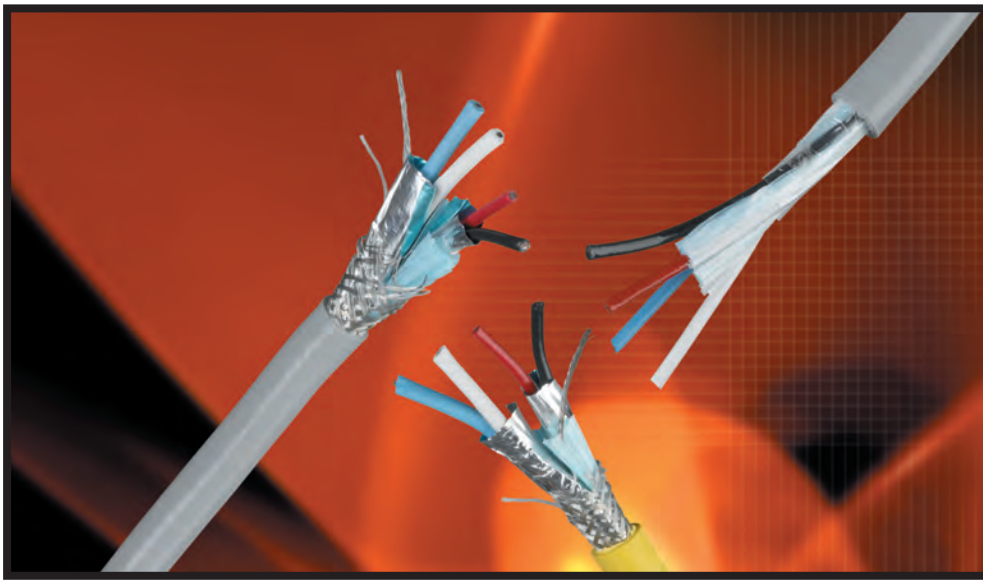
New Product Bulletin

NP 243

DeviceBus® Cables

Belden® introduces two new DeviceBus cables with TPE Jackets along with adding Red jackets to some cables to designate DeviceNet™ Safety.



Belden Offers An Extensive Line Of DeviceBus Cables For DeviceNet Applications

About DeviceNet

DeviceNet is an ODVA device-level communication protocol for industrial automation. A DeviceNet network is an open, low-cost system link between industrial devices such as sensors and actuators and higher-level devices such as programmable logic controllers and PCs. DeviceNet networks use the network-independent protocol called Common Industrial Protocol (CIP) to provide its control, configure and data collection capabilities. Additional flexibility is offered via the network's ability to work with devices from multiple vendors.

Other DeviceNet system benefits include:

- Eliminates the expense associated with hardwiring and traditional "homerun" cabling practices
- Gives users the ability to use device-level diagnostics
- Allows users to configure many products in real time; they can even replace devices on a live network
- Offers a boost in overall system performance (because DeviceNet is able to provide both event-based and timer-based options).

Features of DeviceNet Networks

A DeviceNet network can support up to 64 nodes and the network end-to-end distance is variable, based on network speed. At 125 Kb/s, the maximum network distance is up to 500m. At the highest speed, 500 Kb/s, the maximum network distance is up to 100m. The bus topology is a trunkline-dropline linear bus.

A feature unique to DeviceNet is the ability to add a power tap at any point (with a maximum power pair ampacity of 8 amps), allowing for redundant power supplies.

The Red-jacketed cables designate DeviceNet Safety. The DeviceNet Safety standard allows users to place safety devices on the same network as their standard controls.

DeviceNet typically uses data and power conductors from the same cable, such as Product No. 3082A. In the DeviceBus line, Product No. 3082KP is the exception to the data/power pair rule since it has four power conductors.

DeviceBus cables are typically designated as either Class 1 (600V) or Class 2 (300V) "Thick," "Thin," or "Mid" cable and they can be used for either trunk or drop applications, dependent on the system speed and overall end-to-end distance. *(See Communications Rate Table.)*

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DeviceNet Communications Rate Table

Communications Rate	Maximum Distance													
	7897A		7896A		7900A		3082A		3082F		1345F		3083A	
	Ft.	m	Ft.	m	Ft.	m	Ft.	m	Ft.	m	Ft.	m	Ft.	m
125 Kbps	1640	500	1378	420	328	100	1640	500	1640	500	1640	500	1640	500
250 Kbps	820	250	656	200	328	100	820	250	820	250	820	250	820	250
500 Kbps	328	100	328	100	328	100	328	100	328	100	328	100	328	100

Communications Rate	Maximum Distance									
	3084A		3084F		1346F		3085A		7895A	
	Ft.	m	Ft.	m	Ft.	m	Ft.	m	Ft.	m
125 Kbps	328	100	328	100	328	100	328	100	984	300
250 Kbps	328	100	328	100	328	100	328	100	820	250
500 Kbps	328	100	328	100	328	100	328	100	328	100

Features and Benefits

Belden DeviceBus cables provide the following features and benefits:

- Fully compliant with ODVA specifications
- TC-ER and PLTC-ER ratings are applicable on certain cables
- Data and power functionality in one cable
- Reduced cable and installation costs
- Noise resistant
- New Red jackets on products designating DeviceNet Safety
- Fully compliant with ROHS Directive

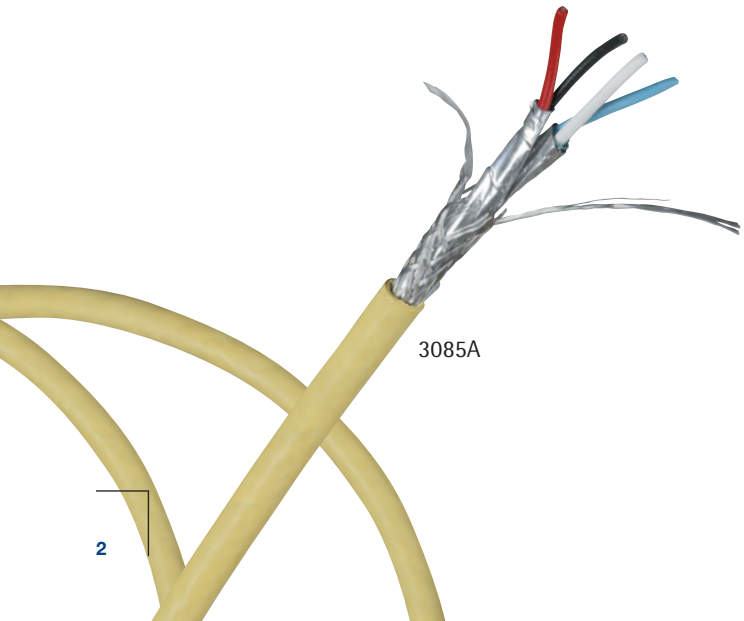
Most DeviceBus cables have heavy-duty, sunlight- and oil-resistant PVC-jacketed constructions. Two Class 2 cables — Product Nos. 3083A and 3085A — are offered with Yellow CPE jackets for extremely harsh industrial environments.

New Products, 1345F and 1346F with TPE jackets, provide flexible performance at low temperatures, along with excellent oil, solvent and abrasion resistance in harsh environments.

In the paired cables, the power pairs have PVC or PVC/nylon insulation; the data pairs have either FEP or F-R Polypropylene insulation. Class 1 Product Nos. 7896A, 7897A and 7900A are designated for cable tray use and are able to occupy the same tray or conduit as 600-Volt cables.

Class 2 Thick Product Nos. 3082A, 3082F, 1345F and 3083A are designated for power limited tray use and are able to occupy the same tray or conduit as 300-Volt cables.

Belden has long been a leader in the manufacture of DeviceNet cables and in conjunction with its active membership in ODVA, Belden spearheads the development of many innovative cabling solutions. Be sure to contact Belden about other DeviceNet cabling options.



3085A

Industrial Data Solutions® — Industrial Data

DeviceBus for ODVA DeviceNet

Description	Part No.	UL NEC/ C(UL) CEC Type	Standard Lengths		Standard Unit Weight		Conductor (stranding) Diameter Nom. DCR	Shielding Materials Nom. DCR	Color Code	Nominal OD		Nom. Imp. (W)	Nom. Vel. of Prop.	Nominal Capacitance		Nominal Attenuation		
			Ft.	m	Lbs.	kg				Inch	mm			pF/Ft.	pF/m	MHz	dB/ 100 Ft.	dB/ 100m

600V Class 1 Thick • 15 and 18 AWG Stranded Tinned Copper • 100% Individually Foil Shielded + Overall 65% TC Braid • Drain Wire*

PVC/Nylon Insulation (Power) • **FEP Insulation** (Data) • **Gray Sunlight/Oil-resistant PVC Jacket**

High Velocity Thick 600V 75°C **7897A**

NEC:	500	152.4	69.5	31.6	(2)15 AWG TC (19x28) 3.6Ω/M′ 11.8Ω/km	100% Individual Foil + Overall 65% TC Braid	Power Pair: Red & Black	.460	11.70		—						
TC-ER	1000	304.8	135.0	61.3													
CEC:	2000	609.6	274.0	124.4													
FT1																	
					(2)18 AWG TC (19x30) 6.9Ω/M′ 22.6Ω/km	1.8Ω/M′ 5.9Ω/km	Data Pair: Blue & White			Data: 120	75%	12.0	39.4	.125 .500 1.000	.13 .25 .40	.43 .82 1.31

* 18 AWG stranded (19x30) tinned copper drain wire.
Meter marks on jacket to aid users in installation.
Allen-Bradley P/N 1485 CPI-A

600V Class 1 ODVA Cable V • 16 and 18 AWG Stranded Tinned Copper • 100% Individually Foil Shielded + Overall 65% TC Braid • Drain Wire*

PVC/Nylon Insulation (Power) • **F-R Polypropylene Insulation** (Data) • **Gray Sunlight/Oil-resistant PVC Jacket**

600V 75°C **7896A**

NEC:	500	152.4	89.0	40.4	(2)16 AWG TC (19x29) 4.9Ω/M′ 16.1Ω/km	100% Individual Foil + Overall 65% TC Braid	Power Pair: Red & Black	.525	13.34		—						
TC-ER	1000	304.8	168.0	76.2													
CEC:	2000	609.6	340.0	154.2													
FT1																	
					(2)18 AWG TC (19x30) 6.9Ω/M′ 22.6Ω/km	1.8Ω/M′ 5.9Ω/km	Data Pair: Blue & White			Data: 120	64%	14.7	48.2	.125 .500 1.000	.13 .25 .40	.43 .82 1.31

* 16 AWG stranded (19x29) tinned copper drain wire.
C(UL) AWM I/II A/B
Meter marks on jacket to aid users in installation.
Allen-Bradley P/N 1485 CPI-A

600V Class 1 ODVA Cable IV • 16 and 18 AWG Stranded Tinned Copper • Unshielded

PVC/Nylon Insulation (Power) • **F-R Polypropylene Insulation** (Data) • **Gray Sunlight/Oil-resistant PVC Jacket**

Drop 600V 75°C **7900A**

NEC:	500	152.4	51.0	23.1	(2)16 AWG TC (19x29) 4.9Ω/M′ 16.1Ω/km	Unshielded	Power Pair: Red & Black	.430	10.92		—						
TC-ER	1000	304.8	105.0	47.6													
CEC:																	
FT1																	
					(2)18 AWG TC (19x30) 6.9Ω/M′ 22.6Ω/km		Data Pair: Blue & White			Data: 120	64%	14.7	48.2	.125 .500 1.000	.13 .25 .40	.43 .82 1.31

C(UL) AWM I/II A/B
Meter marks on jacket to aid users in installation.
Allen-Bradley P/N 1485 CPI-C

DCR = DC Resistance • FEP = Fluorinated Ethylene-propylene • F-R = Flame-retardant • TC = Tinned Copper • TC-ER = Tray Cable Exposed Run per 2005 NEC Article 336.