

## Description:

Belden's PVC Vari-Twist series was designed to reduce crosstalk in the balanced mode by twisting the pairs, but can be mass-terminated in the flat sections with standard IDC connectors.

## Physical Characteristics (Overall)

### Conductor

#### AWG:

# Pairs	AWG	Stranding	Conductor Material
32	28	7x36	TC - Tinned Copper

Conductor Spacing Center to Center Flat Section: .050 +/- .005

Conductor Spacing Outside Center to Outside Center: 3.15 +/- .020

### Insulation

#### Insulation Material:

Insulation Material	Wall Thickness (in.)
PVC - Polyvinyl Chloride	.010

Substrate Thickness and Material: .010" Clear PVC

Insulation Resistance: >10,000 Mega Ohms

### Outer Shield

#### Outer Shield Material:

Outer Shield Material
Unshielded

### Overall Cabling

Overall Nominal Thickness Flat Section: .042 +/- .003

Overall Nominal Thickness Twisted Section: .080

Overall Nominal Width: 3.20

Overall Flat Section Length: 2 +/- .0

Overall Twisted Length: 18 in.

Flat Section Center to Center Spacing: 20 +/- .50

### Pair

#### Pair Color Code Chart:

Number	Color
1	Brown/Tan
2	Red/Tan
3	Orange/Tan
4	Yellow/Tan
5	Green/Tan
6	Blue/Tan
7	Purple/Tan
8	Gray/Tan
9	White/Tan
10	Black/Tan

Over 10 pair	Repeat as required
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### Spacing

Twisted Pair Spacing Center to Center: .100

### Mechanical Characteristics (Overall)

Operating Temperature Range: -20°C To +105°C

### Applicable Specifications and Agency Compliance (Overall)

#### Applicable Standards & Environmental Programs

UL AWM Style:	2693 and 2697
UL Rating:	105°C, 300 V RMS, VW-1
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):	10/01/2005
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

#### Flame Test

UL Flame Test: VW-1

#### Plenum/Non-Plenum

Plenum (Y/N): No

### Electrical Characteristics (Overall)

#### Nom. Inductance:

Description	Inductance (µH/ft)
@ 1 MHz	.24

#### Nom. Capacitance Conductor to Conductor:

Description	Capacitance (pF/ft)
@ 1 kHz	20
@ 1 MHz	16

#### Nominal Velocity of Propagation:

Description	VP (%)
	64

#### Nominal Delay:

Delay (ns/ft)
1.6 NS/FT.

#### Nom. Conductor DC Resistance:

DCR @ 20°C (Ohm/1000 ft)
68.2 OHMS/1000 FT. MAX.

#### Nom. Attenuation:

Freq. (MHz)	Attenuation (dB/100 ft.)
10	3.5
20	5.5
30	7.2
40	8.8
50	10.2
60	12
70	13
80	14.2

90	15
100	16

**Max. Operating Voltage - UL:**

Voltage
300 V RMS

**Max. Recommended Current:**

Current
1 Amp per conductor @ 20°C

**Nominal Balanced Characteristic Impedance:**

Description	Impedance (Ohm)
	115

**Nominal Unbalanced Characteristic Impedance:**

Description	Impedance (Ohm)
	100

**Dielectric Withstand Voltage:** 2,000 V RMS

**Typical Balanced Crosstalk - dB Suppression:**

Description	Freq. (MHz)	Start Freq. (MHz)	Stop Freq. (MHz)	Crosstalk (dB)
10 ft. sample length		10	100	35

**Typical Unbalanced Crosstalk:**

Description	Pulse Rise Time (NS) (MHz)	Near End % (MHz)	Far End % (MHz)
10 ft. sample length all grounds connected together.	3	5.8	5.2
10 ft. sample length all grounds connected together.	5	4	3.2
10 ft. sample length all grounds connected together.	7	2.5	2.8

## Notes (Overall)

**Notes:** The transition area is included in the twisted length to assure a full 2 inches of flat termination area.

## Kennedy Information (Overall)

**Construction:** 18" of Twisted Pairs, 2" of Flat Section

## Put Ups and Colors:

Item #	Putup	Ship Weight	Color	Notes	Item Desc
9V28064 000H100	100 FT	11.100 LB	NONE	E	32 PR #28 PVC VARI-TWIST

**Notes:**

E = MAY CONTAIN MORE THAN 1 PIECE. MINIMUM LENGTH OF ANY ONE PIECE IS 25'

# Vari-Twist® 9V280XX Series

.050" Pitch, 28 AWG, PVC

## Product Description

Belden's PVC Vari-Twist 9V280XX series was designed to reduce crosstalk in the balanced mode by twisting the pairs, but can be mass-terminated in the programmed flat sections with any standard IDC connector. To further reduce crosstalk, each adjacent pair is twisted in the opposite direction. The standard twist length is 18 inches followed by a 2 inch flat section of .050" spaced conductors. The cable consists of stranded 28 AWG (7x36) tinned copper, color-coded PVC pre-insulated singles — laminated to a single clear PVC substrate. Eleven various conductor/pair counts are standard; other sizes are available upon request. The cable is UL approved (CSA available upon request) and passes the VW-1 Vertical Wire Flame Test.

Upon your request, Vari-Twist can also be manufactured to your own specific requirements whether that be longer or shorter twist sections and/or flat sections.

**Color Code:** Each pair consists of a Tan conductor paired with a color-coded conductor. *Color Sequence Each Terminating Section:* Brown/Tan, Red/Tan, Orange/Tan, Yellow/Tan, Green/Tan, Blue/Tan, Purple/Tan, Gray/Tan, White/Tan, Black/Tan. Sequence is repeated as necessary.

**Application:** Internal interconnection or internal wiring of electronic equipment.

## Physical Specifications

<b>Conductor</b>	28 AWG (7x36) Tinned Copper
<b>Insulation</b>	.010" Nom. Wall Color-coded PVC
<b>Substrate</b>	.010" Nom. Wall Clear PVC
<b>Pitch</b>	
Twisted Pair Centers:	.100" Nom.
Conductor Centers in Flat:	.050" ± .005"
<b>Pairs</b>	1/2" Nom. Lay
	Adjacent Pairs have Opposite Direction Lay
<b>Construction</b>	18" of Twisted Pairs 2" of Flat Section
<b>Temperature Rating</b>	-20 to +105°C
<b>Flammability Rating</b>	UL: VW-1
<b>UL Approval</b>	File #E12683, Style Dual Rated 2693 & 2697
<b>CSA Approval</b>	Available Upon Request
<b>Packaging</b>	H100

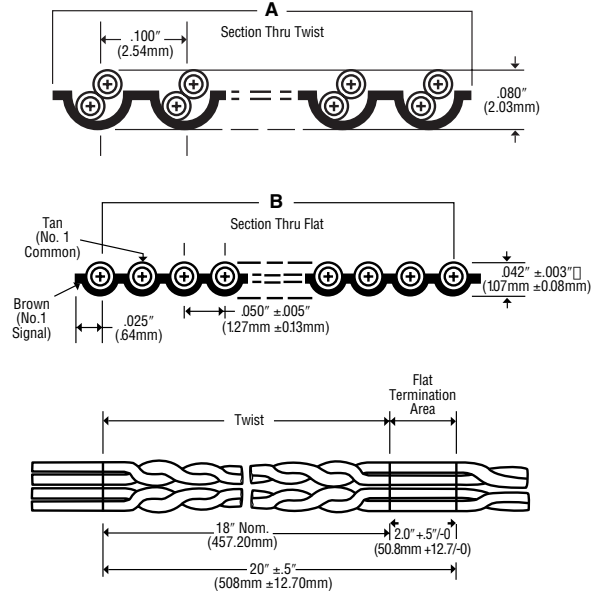
## Electrical Specifications

<b>Voltage Rating</b>	300V RMS
<b>Current Rating</b>	1A
<b>Conductor Resistance</b>	68.2Ω/1000 ft.
<b>Insulation Resistance</b>	>1 x 10 <sup>10</sup> Ω • 10 ft. (3m)
<b>Impedance (Balanced)</b>	115Ω
<b>Impedance* (Unbalanced)</b>	100Ω
<b>Capacitance* (@ 1 MHz)</b>	16 pF/ft. (52 pF/m)
<b>Inductance* (@ 1 MHz)</b>	.24 μH/ft. (.79 μH/m)
<b>Propagation Delay*</b>	1.60 ns/ft. (5.25 ns/m)

\*Test Configuration: G-S (ground-signal), unbalanced.

Part No.	No. of Pairs	Dimensions			
		Width "A"		Span "B"	
		Inch	mm	Inch	mm
9V28010	5	.50	12.70	.45 ±.012	11.43 ±.31
9V28014	7	.70	17.78	.65 ±.012	16.51 ±.30
9V28016	8	.80	20.32	.75 ±.012	19.05 ±.30
9V28020	10	1.00	25.40	.95 ±.015	24.13 ±.38
9V28026	13	1.30	33.02	1.25 ±.015	31.75 ±.38
9V28034	17	1.70	43.18	1.65 ±.015	41.91 ±.38
9V28036	18	1.80	45.72	1.75 ±.017	44.45 ±.43
9V28040	20	2.00	50.80	1.95 ±.017	49.53 ±.43
9V28050	25	2.50	63.50	2.45 ±.017	62.23 ±.43
9V28060	30	3.00	76.20	2.95 ±.020	74.93 ±.51
9V28064	32	3.20	81.28	3.15 ±.020	80.01 ±.51

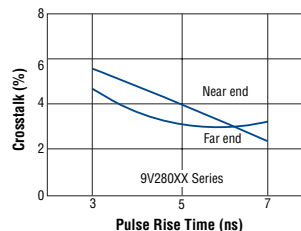
## Dimensions



NOTE: the transition area is included in the twisted section to assure a full 2 Inches of flat termination area.

## Unbalanced Crosstalk\*

(See page 7.14 for Balanced Crosstalk)



## Attenuation\*

