

## General Information and Selection

Different strain gage installation conditions and test specifications often necessitate the use of different types or sizes of leadwires. For accurate, reliable strain measurements, it is important to use an appropriate type of leadwire for each installation. Micro-Measurements stocks a wide variety of wires and cables, cataloged in tabular form on the following pages. All wires and cables listed in the tables have been proven in the field to give excellent sensor performance when properly used in the specified environments. Special gage wiring problems may require the use of wires not listed here. In such cases, our Applications Engineering Department can recommend appropriate wire types and can suggest suppliers.



### WIRE AND CABLE CODING SYSTEM

Number of Conductors ———— **3 26 — D F V**  
 AWG (American Wire Gauge) Wire Size ————

#### Types of Wire

**A:** Solid copper  
**B:** Stranded copper  
**D:** Tinned stranded copper  
**F:** Silver-plated stranded  
**G:** Nickel-clad solid copper  
**H:** Solid Manganin  
**J:** Solid Balco®

#### Construction

**F:** Flat cable  
**J:** Twisted cable with jacket  
**S:** Shielded/twisted with jacket  
**T:** Twisted cable without jacket  
**W:** Round single wire

#### Insulation

**E:** Etched TFE Teflon®  
**F:** Fiberglass braid  
**K:** Kapton® (polyimide) wrap  
**N:** Nylon/polyurethane enamel  
**P:** Polyurethane enamel  
**Q:** Polyimide enamel  
**T:** TFE Teflon®  
**V:** Vinyl (PVC)  
**Z:** Teflon PFA

AWG	Diameter (nominal)		AWG	Diameter (nominal)	
	in	(mm)		in	(mm)
22	0.0253	0.643	34	0.0063	0.160
26	0.0159	0.404	36	0.0050	0.127
27	0.0142	0.361	37	0.0045	0.114
30	0.0100	0.254	42	0.0025	0.064

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 Teflon and Kapton are Registered Trademarks of DuPont.

\*Solid core wire

### RIBBON WIRE CODING SYSTEM

Number of Conductors ———— **1 G L 64 001** ———— Thickness, in mils  
 Alloy ———— **Width**  
**G:** NiClad copper **64:** 1/64 in (0.4 mm)  
**K:** Nichrome V **L:** Uninsulated ribbon **16:** 1/16 in (1.6 mm)  
**08:** 1/8 in (3.2 mm)

The Wire and Cable Coding System shown above gives the unique designation of each wire type for ordering purposes. The leadwire and cabling selection charts presented on the next three pages are organized





according to the number of conductors. All wires and cables are supplied on spools for user convenience. Some styles may not be continuous length.

#### References:

- Application Note: TT-601, Techniques for Bonding Leadwires to Surfaces Experiencing High Centrifugal Forces.
- Application Note: TT-604, Leadwire Attachment Techniques for Obtaining Maximum Fatigue Life of Strain Gages.
- Application Note: TT-608, Techniques for Attaching Leadwires to Unbonded Strain Gages.

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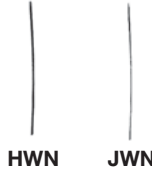

Micro-Measurements is pleased to announce a new “Z” wire family that has been added to the product catalog. This “Z” designation consists of silver plated copper conductors\*, in a solid or stranded construction, along with the Teflon PFA insulation for high temperature performance in a flexible conductor. The “Z” wire is available in multiple sizes and constructions including single conductors up to a 12 conductor twisted and shielded version.

SINGLE CONDUCTOR			
	Type	Packaging	Description
		Foot (Meter)	
	<b>136-AWZ-X, 134-AWZ-X</b>	328 (100)	<b>Solid silver-plated copper wire, Teflon® PFA insulation:</b> Wide temperature range. Rated from -320° to +392°F (-195° to +200°C). Specify in the "X" the color code: (R) red, (W) white, (B) black, (G) green, (BL) blue or (Y) yellow.
	<b>132-FWZ-X, 134-FWZ-X, 136-FWZ-X</b>	328 (100)	<b>Stranded silver-plated copper wire, Teflon® PFA insulation:</b> Wide temperature range. Rated from -320° to +392°F (-195° to +200°C). Specify in the "X" the color code: (R) red, (W) white, (B) black, (G) green.
MULTI CONDUCTOR			
	<b>336-FTZ</b>	328 (100)	<b>Stranded silver-plated copper wire, three conductor twisted cable, 36 AWG, Teflon® PFA insulation, flexible cable.</b> For use from -320° to +392°F (-195° to +200°C). Conductors are red, white and black.
TWISTED AND SHIELDED			
	<b>X36-FSZ</b>	100 (30)	<b>Stranded silver-plated copper wire, 36 AWG, Teflon® PFA insulation, braided shield, Teflon® PFA jacket:</b> Small, flexible cable. Rated from -320° to +392°F (-195° to +200°C). Specify in the "X" the number of conductors available in 3, 4, 6 and 12 bundles.
	<b>X32-FSZ</b>	100 (30)	<b>Stranded silver-plated copper wire, 32 AWG, Teflon® PFA insulation, braided shield, Teflon® PFA jacket:</b> Small, flexible cable. Rated from -320° to +392°F (-195° to +200°C). Specify in the "X" the number of conductors; available in 4, 6 and 12 bundles.
	<b>1236-FJZ</b>	100 (30)	<b>Stranded silver-plated copper wire, 36 AWG, multi-conductor twisted cable, Teflon® PFA insulation, braided shield, no jacket, flexible cable.</b> Rated from -320° to +392°F (-195° to +200°C). 12 conductor bundle.
	<b>X32-FJZ</b>	100 (30)	<b>Stranded silver-plated copper wire, multi-conductor twisted cable, 32 AWG, Teflon® PFA tape insulation, braided shield, Teflon PFA Tape with a black PUR jacket:</b> Small, flexible cable. Rated from -40° to +167°F (-40° to +75°C). Specify in the "X" the number of conductors; available in 4 or 7 conductor bundles.

\* For more hostile applications, consider using the Tetra-Etch compound to promote the adhesive between the insulation and the environmental coating(s).

\*\* Some types may not be continuous length.

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SINGLE-CONDUCTOR TYPES: SOLID WIRE			
Type	Packaging	Description	
	Foot (Meter)*		
 AWP      AWN	<b>134-AWP</b> <b>136-AWP</b>	500 ft (150 m) 500 ft (150 m)	<b>Solid copper wire, polyurethane enamel:</b> General-purpose intragage hookup wire. Useful from -100° to +300°F (-75° to +150°C). Enamel coating easily removed by applying heat from soldering iron.
	<b>127-AWN</b> <b>130-AWN</b> <b>134-AWN</b> <b>136-AWN</b>	500 ft (150 m) 500 ft (150 m) 500 ft (150 m) 500 ft (150 m)	<b>Solid copper wire, nylon/polyurethane enamel:</b> Identical in use and specifications to Type AWP above, but with superior abrasion resistance and slightly reduced insulation resistance at elevated temperatures. 134-AWN and 136-AWN are available in four colors; specify: -R (red), -W (white), -B (black), -G (green).
 AWQ      GWF	<b>134-AWN</b> <b>136-AWN</b>	328 ft (100 m) 328 ft (100 m)	<b>Solid silver-plated copper wire, Teflon® insulation:</b> Wide temperature range. Useful from -320° to +392°F (-195° to +200° C). When bonding to Teflon-insulated wire, insulation must be treated with Tetra-Etch® compound (see "Special Purpose Materials.") Specify red, white, black, green, blue or yellow.
	<b>127-AWQ</b> <b>130-AWQ</b> <b>134-AWQ</b>	500 ft (150 m) 500 ft (150 m) 500 ft (150 m)	<b>Solid copper wire, polyimide enamel:</b> Intragage hookup wire. Temperature range -452° to +600°F (-269° to +315°C) short term. Enamel is extremely tough and abrasion resistant, with excellent electrical properties; generally removed by mechanical scraping or sanding.
 HWN      JWN	<b>126-GWF</b> <b>126-GWF</b>	100 ft (30 m) 1000 ft (300 m)	<b>Solid nickel-clad copper wire, fiberglass braid insulation:</b> Useful from -452° to +900°F (-269° to +480°C). Recommended for use with WK-Series gages when silver solder is used for lead attachment.
	<b>137-HWN</b>	200 ft (60 m)	<b>Solid manganin wire, nylon/polyurethane enamel:</b> Used for bridge balance and span set in transducer circuits. Nominal resistance: 14 ohms/ft (50 ohms/m). Temperature range: +10° to +125°F (-10° to +50°C).
<b>142-JWN</b>	500 ft (150 m)	<b>Solid Balco® wire, nylon/polyurethane enamel:</b> Used for bridge temperature compensation of zero shift or span. Nominal resistance: 19 ohms/ft (65 ohms/m). Temperature coefficient of resistance: +0.25%/°F (+0.45%/°C). Temperature range: +10° to +300°F (-10° to +150°C).	
SINGLE-CONDUCTOR TYPES: STRANDED WIRE			
Type	Packaging	Description	
	Foot (Meter)*		
 DWV    FWK    FWT	<b>126-DWV</b>	100 ft (30 m)	<b>Stranded tinned-copper wire, vinyl insulation:</b> General-purpose leadwire. Useful to +180°F (+80°C). Vinyl insulation becomes brittle at low temperature; not normally used below -60°F (-50°C). Specify red, white, black, or green.
	<b>126-FWK</b>	25 ft (7.5 m)	<b>Stranded silver-plated copper wire, Kapton® polyimide insulation:</b> High- performance. Recommended for unusually severe service from -452° to over +600°F (-269° to +315°C) short term. Excellent resistance to abrasion, radiation, and outgassing in high vacuum. Treated for bondability.
	<b>130-FWT</b>	100 ft (30 m)	<b>Stranded silver-plated copper wire, Teflon® insulation:</b> Wide temperature range. Useful from -452° to +500°F (-269° to +260°C). When bonding to Teflon-insulated wire, insulation must be treated with Tetra-Etch® compound (see "Special-Purpose Materials.") Specify red, white, black, or green.



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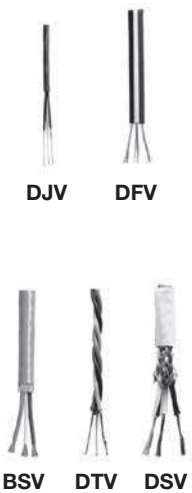







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		THREE-CONDUCTOR CABLE		Description	
		Type	Packaging Foot (Meter)*		
 <p>DJV DFV BSV DTV DSV</p>	<b>322-DJV</b>	500 ft (150 m)	<b>Stranded tinned-copper wire, 3-conductor twisted cable, chrome PVC vinyl jacket, vinyl insulation:</b> Good choice for use with EGP-Series Embedment Strain Gages. Color-coded red/white/black.	 <b>RoHS</b> COMPLIANT	
	<b>326-DFV</b> <b>326-DFV</b> <b>330-DFV</b> <b>330-DFV</b>	100 ft (30 m) 1000 ft (300 m) 100 ft (30 m) 1000 ft (300 m)	<b>Stranded tinned-copper wire, 3-conductor flat cable, vinyl insulation:</b> Convenient general-purpose cable. For use from -60° to +180°F (-50° to +80°C). Flat construction requires minimum space. Color-coded red/white/black.		
	<b>326-BSV</b> <b>326-BSV</b>	100 ft (30 m) 1000 ft (300 m)	<b>Stranded copper wire, 3-conductor twisted cable, PVC insulated, braided shield:</b> For use from -60° to 180°F (-50° to +80°C).		
	<b>326-DTV</b> <b>326-DTV</b>	100 ft (30 m) 1000 ft (300 m)	<b>Stranded tinned-copper wire, 3-conductor twisted cable, vinyl insulation:</b> Convenient general-purpose cable for low electrical noise pickup. For use from -60° to +180°F (-50° to +80°C). Color-coded red/white/black.		
	<b>326-DSV</b> <b>326-DSV</b>	100 ft (30 m) 1000 ft (300 m)	<b>Stranded tinned-copper wire, 3-conductor twisted cable, vinyl insulation, braided shield, vinyl jacket:</b> Special-purpose cable to minimize electrical noise interference. Useful from -60° to +180°F (-50° to +80°C). Color-coded red/white/black.		
 <p>FFE</p>	<b>330-FFE</b> <b>330-FFE</b>	100 ft (30 m) 1000 ft (300 m)	<b>Stranded silver-plated copper wire, 3-conductor flat cable, etched Teflon® insulation:</b> For use from -452°F to +500°F (-269°C to +260°C). Color-coded red/white/black. Insulation treated for bonding.	 <b>RoHS</b> COMPLIANT	
 <p>FJT FTE GJF</p>	<b>330-FJT</b> <b>330-FJT</b>	100 ft (30 m) 1000 ft (300 m)	<b>Stranded silver-plated copper wire, 3-conductor twisted cable, Teflon insulation, Teflon jacket:</b> Small, flexible. For use from -452° to +392°F (-269° to +200°C). Color-coded red/white/black. When bonding Teflon-insulated wire, insulation must be treated with Tetra-Etch® compound (see "Special-Purpose Materials.")	 <b>RoHS</b> COMPLIANT	
	<b>336-FTE</b>	50 ft (15 m)	<b>Stranded silver-plated copper wire, 3-conductor twisted cable, etched Teflon insulation:</b> Small, flexible cable. For use from -452° to +500°F (-269° to +260°C). Color-coded red/white/black. Insulation treated for bonding.		
	<b>336-FST</b>	100 ft (30 m)	<b>Stranded silver-plated copper wire, 3-conductor twisted cable, Teflon® insulation, braided shield, Teflon jacket:</b> small flexible cable. for use from -320° to +329°F (-195° to +200°C). Color-coded red/white/black. When bonding Teflon-insulated wire, insulation must be treated with TetraEtch® compound (see Special Purpose Materials, document number 11008).		

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	<b>326-FTE</b> <b>326-FTE</b> <b>330-FTE</b> <b>330-FTE</b>	100 ft (30 m) 500 ft (150 m) 100 ft (30 m) 500 ft (150 m)	<b>Stranded silver-plated copper wire, 3-conductor twisted cable, etched Teflon insulation:</b> For use from -452° to +500°F (-269° to +260°C). Color-coded red/white/black. Insulation treated for bonding.	
	<b>326-GJF</b> <b>326-GJF</b>	100 ft (30 m) 1000 ft (300 m)	<b>Solid nickel-clad copper wire, 3-conductor twisted cable, fiberglass braid insulation and jacket:</b> For use from -452° to +900°F (-269° to +480°C). Recommended for use with WK-Series gages when silver solder is used for lead attachment. Color-coded red/white/black.	

		FOUR-CONDUCTOR CABLE		
		Type	Packaging Foot (Meter)*	Description
		<b>426-BSV</b>	100 ft (30 m)	<b>Stranded copper wire, 4-conductor twisted cable, PVC insulated braided shield:</b> For use from -60° to +180°F (-50°C to +80°C).
		<b>426-BSV</b>	1000 ft (300 m)	
<b>BSV</b>	<b>DFV</b>	<b>426-DFV</b>	100 ft (30 m)	<b>Stranded tinned-copper wire, 4-conductor flat cable, vinyl insulation:</b> For use from -60° to +180°F (-50° to +80°C). Conductors easily separated for stripping and wiring. Color-coded red/white/black/green.
		<b>430-DFV</b>	100 ft (30 m)	
		<b>430-DFV</b>	1000 ft (300 m)	
		<b>422-DSV</b>	100 ft (30 m)	<b>Stranded tinned-copper wire, 4-conductor polypropylene insulated:</b> Twisted shielded pairs (red/black and white/green) with a drain wire, PVC jacket. For use from -60° to +180°F (-50°C to +80°C).
		<b>422-DSV</b>	1000 ft (300 m)	
		<b>424-DSV</b>	100 ft (30 m)	
		<b>424-DSV</b>	1000 ft (300 m)	
<b>DSV</b>	<b>DTV</b>	<b>426-DTV</b>	100 ft (30 m)	<b>Stranded tinned-copper wire, 4-conductor twisted cable, vinyl insulation:</b> For use from -60° to +180°F (-50° to +80°C). Color-coded red/white/black/green.
		<b>426-DTV</b>	1000 ft (300 m)	
		<b>430-FST</b>	100 ft (30 m)	<b>Stranded silver-plated copper wire, 4-conductor twisted cable, Teflon® insulation, braided shield, Teflon jacket:</b> Small, flexible cable. For use from -452° to +500°F (-269° to +260°C). Color-coded red/white/black/green. When bonding Teflon-insulated wire, insulation must be treated with Tetra-Etch® compound (see Special-Purpose Materials, document number 11008).
		<b>430-FST</b>	1000 ft (300 m)	
<b>FST</b>	<b>FTE/FTT</b>	<b>426-FTE</b>	100 ft (30 m)	<b>Stranded silver-plated copper wire, 4-conductor twisted cable, etched Teflon insulation:</b> For use from -452° to +500°F (-269° to +260°C). Color-coded red/white/black/green. Insulation treated for bonding.
		<b>426-FTE</b>	500 ft (150 m)	
		<b>436-FFT</b>	100 ft (30 m)	<b>Stranded silver-plated copper wire, 4-conductor twisted cable, Teflon® insulation:</b> Small, flexible cable. For use from -452° to +500°F (-269° to +260°C). Color coded red, white, black, green. When bonding Teflon insulated wire, insulation must be treated with Teflon etchant, such as TEC-1 (see Special- Purpose Materials, document number 11008).
		<b>436-FFT</b>	500 ft (150 m)	
<b>FFT</b>		<b>426-FFT</b>	100 ft (30 m)	<b>Stranded silver-plated copper wire, 4-conductor flat cable, Teflon® insulation:</b> For use from -452° to +500°F (-269° to +260°C). Color coded red, white, black, green. When bonding Teflon insulated wire, insulation must be treated with a Teflon etchant, such as TEC-1 (see Special-Purpose Materials, document number 11008).
		<b>426-FFT</b>	500 ft (150 m)	




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FLAT RIBBON LEAD (UNINSULATED)			
Type	Packaging	Description	
	Foot (Meter)*		
1-GL-64-001	50 ft (15 m)	<b>Uninsulated flat ni-clad copper ribbon:</b> 1/64 in wide x 0.001 in thick (0.4 x 0.025 mm). For use from -452 to 900°F (-269 to +480°C). Can be easily soldered or spot welded.	
1-KL-16-002	50 ft (15 m)	<b>Uninsulated Nichrome V:</b> 1/16 in wide x 0.002 in thick (1.6 x 0.05 mm). For use from -452 to +2000°F (-269 to +1100°C).	
1-KL-08-003	50 ft (15 m)	<b>Uninsulated Nichrome V:</b> 1/8 in wide x 0.003 in thick (3.2 x 0.08 mm). For use from -452 to +2000°F (-269 to +1100°C).	
1-KL-08-005	50 ft (15 m)	<b>Uninsulated Nichrome V:</b> 1/8 in wide x 0.005 in thick (3.2 x 0.127 mm). For use from -452 to +2000°F (-269 to +1100°C).	

**HST-1 HEAT-SHRINKABLE WIRE SPLICE SEALANT**



Fast, easy-to-use method for protecting wire splice connections. Constructed of irradiated polyolefin plastic tubing with a heat-flowable inner liner sealant. Forms an immediate and tight seal to splice connection at a shrink temperature of +275°F (+135°C). Inside diameter before heating is 0.125 in (3.2 mm); after heating, 0.023 in (0.6 mm). Large range of shrinkage allows use with leadwire insulation diameters from 0.03 to 0.11 in (0.75 to 2.8 mm). The operating temperature range is -65° to +230°F (-55° to +110°C). Package of eight 6-in (150-mm) lengths.

**THERMAL WIRE STRIPPER**



The ease and simplicity of operation of the Thermal Wire Stripper make it ideal for most strain gage leadwire stripping. The variable heat control allows stripping of all thermoplastic insulations, including Teflon®, in sizes No. 18 to No. 36 AWG (1 to 0.1 mm diameter). The foot switch and tweezers hand-piece give excellent operator control over the stripping operation. Includes power unit and foot switch, both with 3-wire NEMA plugs, and tweezers handpiece.

- WTS-1:** 110 Vac
- WTS-2:** 220 Vac (not CE rated)
- WTS-A Replacement Elements:** Set of two.

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