MICRO MEASUREMENTS
A VPG Brand

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

3 26 — D F V

- Number of Conductors
- 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

*Solid core wire

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RIBBON WIRE CODING SYSTEM

1 G L 64 001

- Number of Conductors
- Alloy
  - **G:** NiClad copper
  - **K:** Nichrome V
- **L:** Uninsulated ribbon
- Thickness, in mils
- **Width**
  - **64:** 1/64 in (0.4 mm)
  - **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.

General Information and Selection

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.

	Type	Packaging Foot (Meter)	Description
SINGLE CONDUCTOR			
	136-AWZ-X, 134-AWZ-X	328 (100)	**Solid silver-plated copper wire, Teflon® PFA insulation:** 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.
	132-FWZ-X, 134-FWZ-X, 136-FWZ-X	328 (100)	**Stranded silver-plated copper wire, Teflon® PFA insulation:** 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			
	**336-FTZ**	328 (100)	**Stranded silver-plated copper wire, three conductor twisted cable, 36 AWG, Teflon® PFA insulation, flexible cable.** For use from –320° to +392°F (–195° to +200°C). Conductors are red, white and black.
TWISTED AND SHIELDED			
	**X36-FSZ**	100 (30)	**Stranded silver-plated copper wire, 36 AWG, Teflon® PFA insulation, braided shield, Teflon® PFA jacket:** 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.
	X32-FSZ	100 (30)	**Stranded silver-plated copper wire, 32 AWG, Teflon® PFA insulation, braided shield, Teflon® PFA jacket:** 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.
	1236-FJZ	100 (30)	**Stranded silver-plated copper wire, 36 AWG, multi-conductor twisted cable, Teflon® PFA insulation, braided shield, no jacket, flexible cable.** Rated from –320° to +392°F (–195° to +200°C). 12 conductor bundle.
	X32-FJZ	100 (30)	**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: 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.

General Information and Selection

SINGLE-CONDUCTOR TYPES: SOLID WIRE

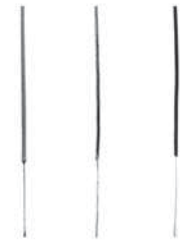

AWP AWN


AWQ GWF


HWN JWN

Type	Packaging Foot (Meter)*	Description	
134-AWP **136-AWP**	500 ft (150 m) 500 ft (150 m)	**Solid copper wire, polyurethane enamel:** 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.	Pb-free RoHS COMPLIANT
127-AWN **130-AWN** **134-AWN** **136-AWN**	500 ft (150 m) 500 ft (150 m) 500 ft (150 m) 500 ft (150 m)	**Solid copper wire, nylon/polyurethane enamel:** 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).	
134-AWN **136-AWN**	328 ft (100 m) 328 ft (100 m)	**Solid silver-plated copper wire, Teflon® insulation:** 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 Pourpose Materials.") Specify red, white, black, green, blue or yellow.	
127-AWQ **130-AWQ** **134-AWQ**	500 ft (150 m) 500 ft (150 m) 500 ft (150 m)	**Solid copper wire, polyimide enamel:** 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.	
126-GWF **126-GWF**	100 ft (30 m) 1000 ft (300 m)	**Solid nickel-clad copper wire, fiberglass braid insulation:** 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.	
137-HWN	200 ft (60 m)	**Solid manganin wire, nylon/polyurethane enamel:** 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).	
142-JWN	500 ft (150 m)	**Solid Balco® wire, nylon/polyurethane enamel:** 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


DWV FWK FWT

Type	Packaging Foot (Meter)*	Description	
126-DWV	100 ft (30 m)	**Stranded tinned-copper wire, vinyl insulation:** 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.	Pb-free RoHS COMPLIANT
126-FWK	25 ft (7.5 m)	**Stranded silver-plated copper wire, Kapton® polyimide insulation:** 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.	
130-FWT	100 ft (30 m)	**Stranded silver-plated copper wire, Teflon® insulation:** 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.	

*Some types may not be continuous length.

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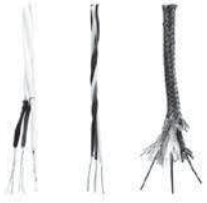
General Information and Selection

	THREE-CONDUCTOR CABLE			
	Type	Packaging Foot (Meter)*	Description	
 DJV DFV	**322-DJV**	500 ft (150 m)	**Stranded tinned-copper wire, 3-conductor twisted cable, chrome PVC vinyl jacket, vinyl insulation:** Good choice for use with EGP-Series Embedment Strain Gages. Color-coded red/white/black.	Pb-free RoHS COMPLIANT
	326-DFV **326-DFV** **330-DFV** **330-DFV**	100 ft (30 m) 1000 ft (300 m) 100 ft (30 m) 1000 ft (300 m)	**Stranded tinned-copper wire, 3-conductor flat cable, vinyl insulation:** 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.	
 BSV DTV DSV	**326-BSV** **326-BSV**	100 ft (30 m) 1000 ft (300 m)	**Stranded copper wire, 3-conductor twisted cable, PVC insulated, braided shield:** For use from –60° to 180°F (–50° to +80°C).	
	326-DTV **326-DTV**	100 ft (30 m) 1000 ft (300 m)	**Stranded tinned-copper wire, 3-conductor twisted cable, vinyl insulation:** 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.	
	326-DSV **326-DSV**	100 ft (30 m) 1000 ft (300 m)	**Stranded tinned-copper wire, 3-conductor twisted cable, vinyl insulation, braided shield, vinyl jacket:** Special-purpose cable to minimize electrical noise interference. Useful from –60° to +180°F (–50° to +80°C). Color-coded red/white/black.	
 FFE	**330-FFE** **330-FFE**	100 ft (30 m) 1000 ft (300 m)	**Stranded silver-plated copper wire, 3-conductor flat cable, etched Teflon® insulation:** For use from –452°F to +500°F (–269°C to +260°C). Color-coded red/white/black. Insulation treated for bonding.	Pb-free RoHS COMPLIANT
 FJT FTE GJF	**330-FJT** **330-FJT**	100 ft (30 m) 1000 ft (300 m)	**Stranded silver-plated copper wire, 3-conductor twisted cable, Teflon insulation, Teflon jacket:** 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.")	Pb-free RoHS COMPLIANT
	336-FTE	50 ft (15 m)	**Stranded silver-plated copper wire, 3-conductor twisted cable, etched Teflon insulation:** Small, flexible cable. For use from –452° to +500°F (–269° to +260°C). Color-coded red/white/black. Insulation treated for bonding.	
	336-FST	100 ft (30 m)	**Stranded silver-plated copper wire, 3-conductor twisted cable, Teflon® insulation, braided shield, Teflon jacket:** 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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	326-FTE **326-FTE** **330-FTE** **330-FTE**	100 ft (30 m) 500 ft (150 m) 100 ft (30 m) 500 ft (150 m)	**Stranded silver-plated copper wire, 3-conductor twisted cable, etched Teflon insulation:** For use from –452° to +500°F (–269° to +260°C). Color-coded red/white/black. Insulation treated for bonding.	
	326-GJF **326-GJF**	100 ft (30 m) 1000 ft (300 m)	**Solid nickel-clad copper wire, 3-conductor twisted cable, fiberglass braid insulation and jacket:** 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.	

BSV DFV

DSV DTV

FST FTE/FTT

FFT

FOUR-CONDUCTOR CABLE

Type	Packaging Foot (Meter)*	Description	
426-BSV **426-BSV**	100 ft (30 m) 1000 ft (300 m)	**Stranded copper wire, 4-conductor twisted cable, PVC insulated braided shield:** For use from –60° to +180°F (–50°C to +80°C).	
426-DFV **426-DFV** **430-DFV** **430-DFV**	100 ft (30 m) 1000 ft (300 m) 100 ft (30 m) 1000 ft (300 m)	**Stranded tinned-copper wire, 4-conductor flat cable, vinyl insulation:** For use from –60° to +180°F (–50° to +80°C). Conductors easily separated for stripping and wiring. Color-coded red/white/black/green.	
422-DSV **422-DSV** **424-DSV** **424-DSV**	100 ft (30 m) 1000 ft (300 m) 100 ft (30 m) 1000 ft (300 m)	**Stranded tinned-copper wire, 4-conductor polypropylene insulated:** 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).	
426-DTV **426-DTV**	100 ft (30 m) 1000 ft (300 m)	**Stranded tinned-copper wire, 4-conductor twisted cable, vinyl insulation:** For use from –60° to +180°F (–50° to +80°C). Color-coded red/white/black/green.	
430-FST **430-FST**	100 ft (30 m) 1000 ft (300 m)	**Stranded silver-plated copper wire, 4-conductor twisted cable, Teflon® insulation, braided shield, Teflon jacket:** 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).	Pb-free RoHS COMPLIANT
426-FTE **426-FTE**	100 ft (30 m) 500 ft (150 m)	**Stranded silver-plated copper wire, 4-conductor twisted cable, etched Teflon insulation:** For use from –452° to +500°F (–269° to +260°C). Color-coded red/white/black/green. Insulation treated for bonding.	
436-FTT **436-FTT**	100 ft (30 m) 500 ft (150 m)	**Stranded silver-plated copper wire, 4-conductor twisted cable, Teflon® insulation:** 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).	
426-FFT **426-FFT**	100 ft (30 m) 500 ft (150 m)	**Stranded silver-plated copper wire, 4-conductor flat cable, Teflon® insulation:** 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).	

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FLAT RIBBON LEAD (UNINSULATED)

Type	Packaging Foot (Meter)*	Description
1-GL-64-001	50 ft (15 m)	**Uninsulated flat ni-clad copper ribbon:** 1/64 in wide x 0.001in 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)	**Uninsulated Nichrome V:** 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)	**Uninsulated Nichrome V:** 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)	**Uninsulated Nichrome V:** 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).

Pb-free
RoHS COMPLIANT

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 tweezer hand- piece give excellent operator control over the stripping operation. Includes power unit and foot switch, both with 3-wire NEMA plugs, and tweezer handpiece.

WTS-1: 110 Vac

WTS-2: 220 Vac (not CE rated)

WTS-A Replacement Elements: Set of two.

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