



CenterLine (Windsor) Limited
CENTERED ON SOLUTIONS



Electrodes Catalogue

Ver. 10.01

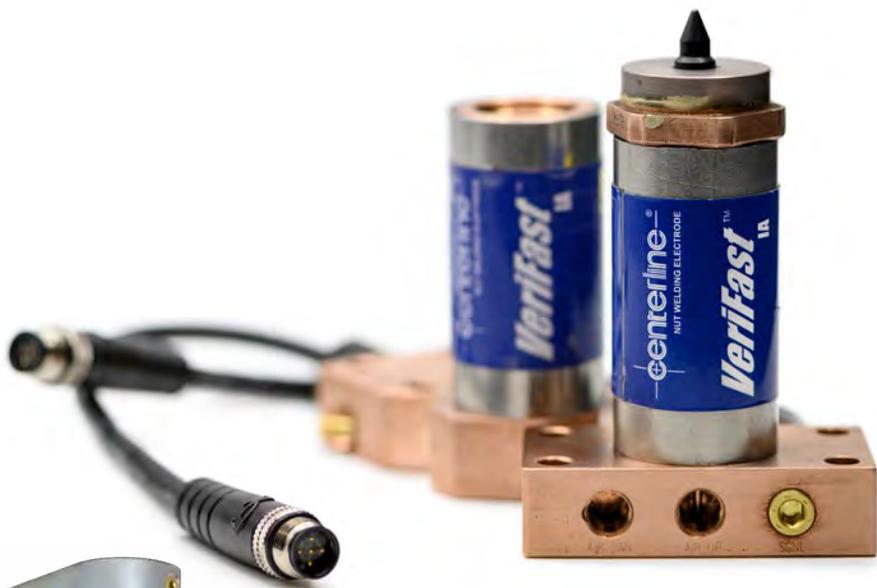


CenterLine's Electrodes Division manufactures and supplies a complete range of consumable welding products, including:

- nut weld electrodes
- cold-formed electrodes
- welding caps
- adapters
- holders
- shunts and cables

All products are available in a range of copper alloys and manufactured to the highest quality standards. A large finished goods inventory ensures standard products are available when needed.

Through its extensive experience, strong engineering support, and a wide range of machining capabilities, our Electrodes Division is a proven commodity supplier to OEMs and Tier suppliers. We provide a wide range of services and capabilities to ensure your automated production welding needs are completely satisfied.



PRODUCTION CAPACITY

The Electrodes Division operates in a modern, highly efficient, well-equipped facility, managed and operated to meet delivery and quality expectations daily.

MANUFACTURING EXCELLENCE

CenterLine continues to invest in machinery, tooling, and people to provide one of the most advanced consumable electrode production facilities in the industry. Strict adherence to material and part specification is of primary importance. CenterLine can be relied upon to consistently supply electrode needs with the quality customers demand and expect.

INVENTORY SUPPORT

Effective inventory management guarantees part supply and satisfies the emergency needs of our customers.

DESIGN ASSISTANCE

With our wealth of application experience, CenterLine can design and manufacture custom components that are specifically suited to unique applications.

PRODUCT DIVERSIFICATION

In addition to offering an abundance of resistance welding consumable products, the Electrodes Division also supplies wire welding contact tips, insulating materials and bushings, weld gun replacement parts, castings, forgings, shunts, cables, spot welding machine arms and caps, seam welding wheels, and many other production-related items.

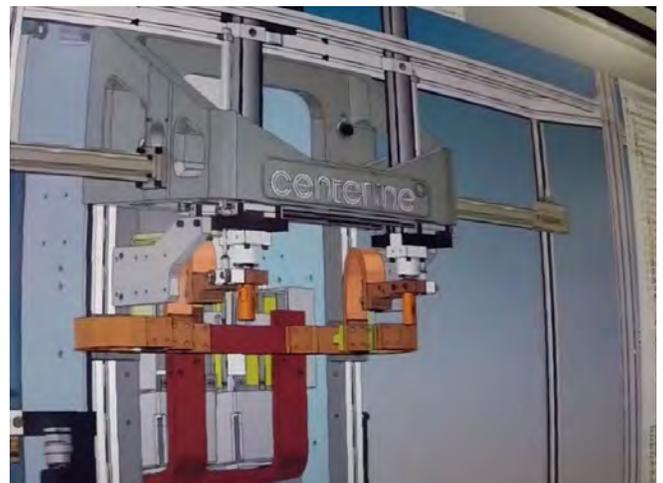


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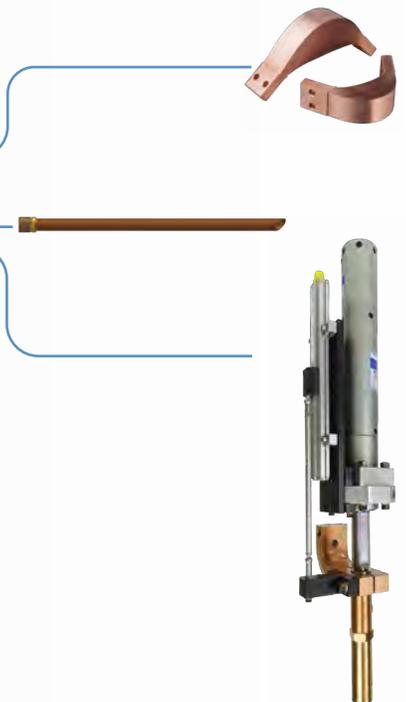
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VeriFast™ IA System Overview

System Overview

VeriFast™ IA System



IA Signal (0-10 V Analog)



To connect to the PLC, the VeriFast™ IA requires a micro (12 mm), 4-pin, shielded, female tool cord, max. 50 ft. (15 m) long.

Establish the part number of each component in the order indicated below.

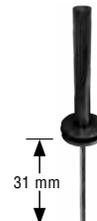
4 **BE Electrode**  (See pages 46, 47)

3 **Weld Head**

 GH Style (For <u>nut</u> or <u>stud</u> welding)	 PH Style (For <u>nut</u> welding; not recommended for stud welding)
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(See page 37)

2 **VeriFast™ IA Weld Pin**

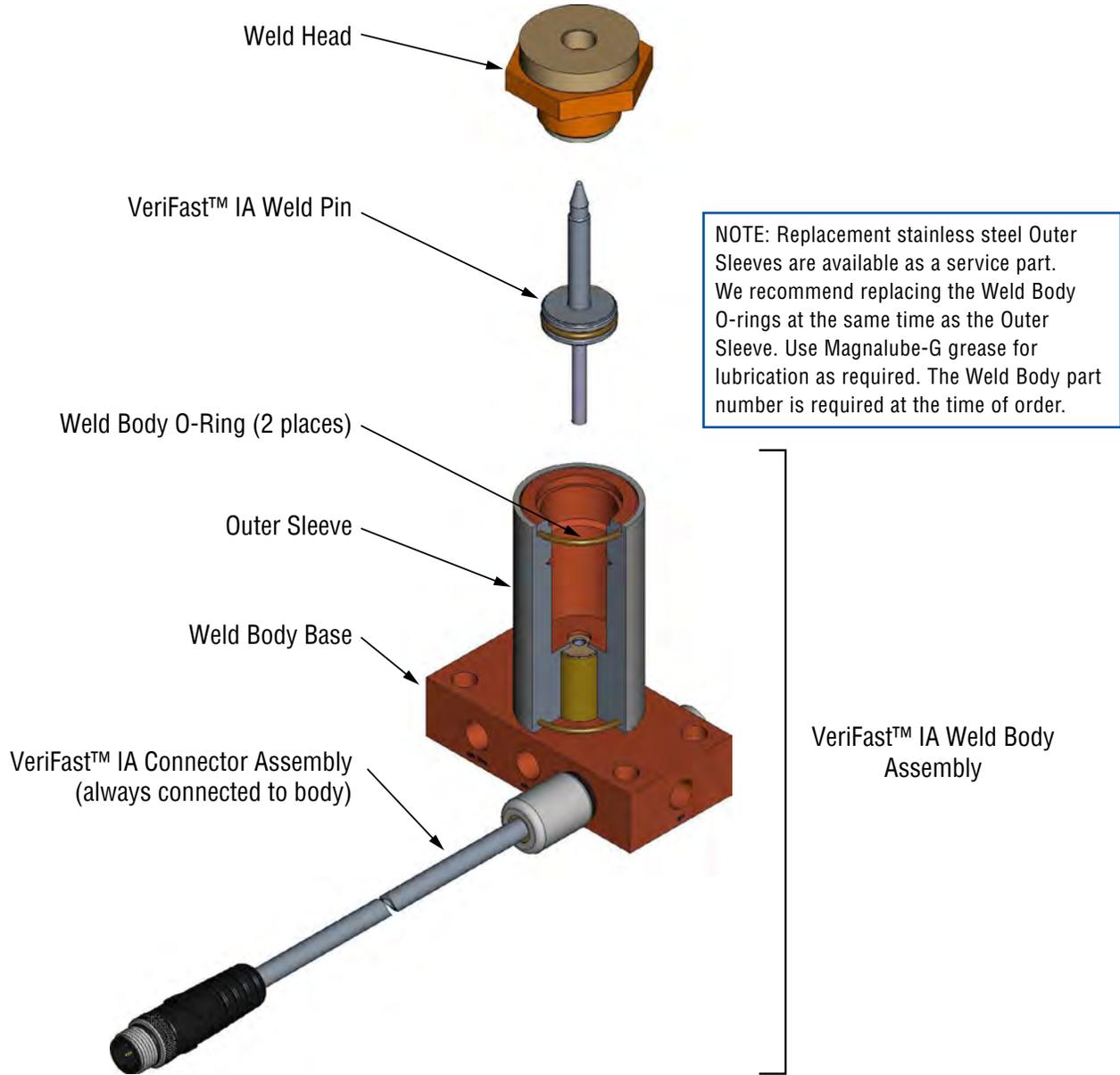
 DB Style Nut Weld Pin (See page 39)	 DB Style Stud Weld Pin (See page 40)	 HE Style Nut Weld Pin (See page 39)	 HE Style Stud Weld Pin (See page 40)	 XZ Style IA Nut Weld Pin (See page 39)	 XZ Style IA Stud Weld Pin (See page 40)	 Elevated Shoulder Style Tapped Nut Weld Pin (See page 43)	 Elevated Shoulder Style Tapped Stud Weld Pin (See page 44)
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1 **VeriFast™ IA Weld Body**

Base Mount 22mm Stroke (See page 10)	Tapered (SXCR) 22mm Stroke (See page 13)	Threaded (SXFR, SXGR) 22mm Stroke (See page 13)	SYVR Base Mount 50mm Stroke (See page 14)	SXZR Base Mount 50mm Stroke (See page 16)	Clamp Mount 22 or 50mm Stroke (See page 17)								
Base Mount Body Options <table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>											SZVR Base Mount 69mm Stroke (See page 15)		
													
													

VeriFast™ IA Weld Body Components

VeriFast™ IA SXAR Weld Body Shown
(Components may vary for other configurations)



Service Parts: (Not including Weld Head or Weld Pin)



Weld Pin O-Ring
Series 2 - SLORD-013
Series 3 - SLORD-017
Series 4 - SLORD-020



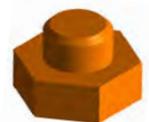
Weld Body O-Ring
Series 2 Body - CL-206
Series 3 Body - CL-306
Series 4 Body - CL-406



Water Connector
RW-1015

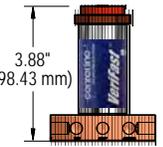
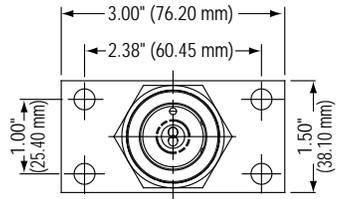
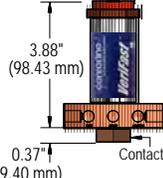
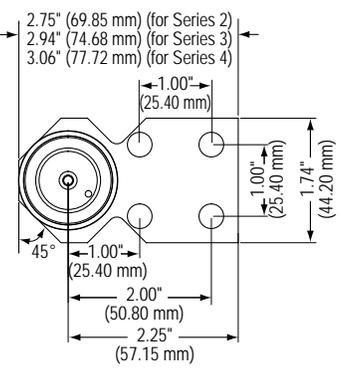
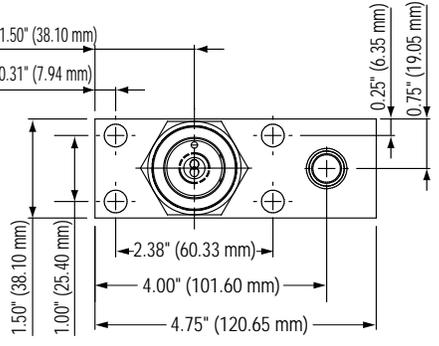
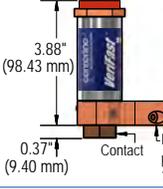
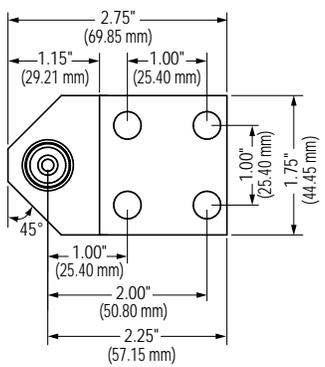
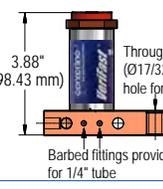
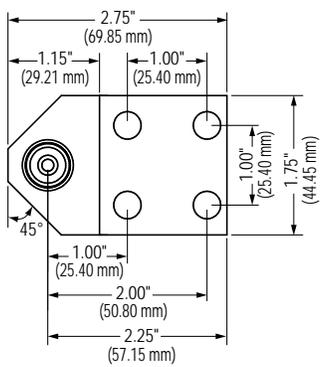
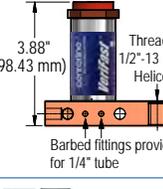
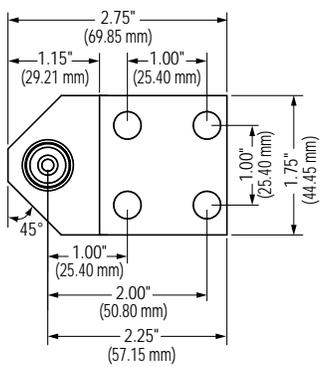
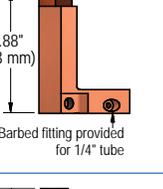
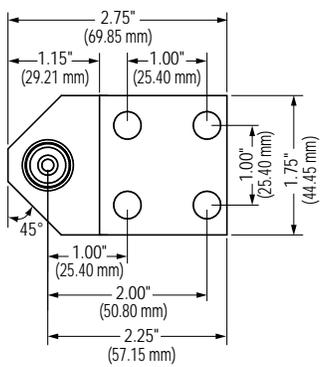
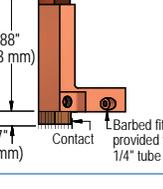


Air Connector
BF1



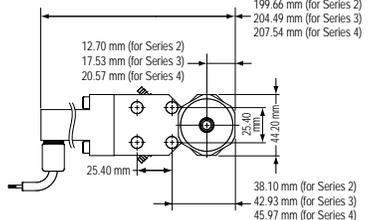
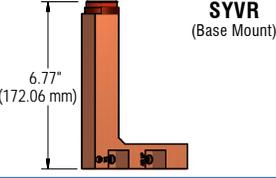
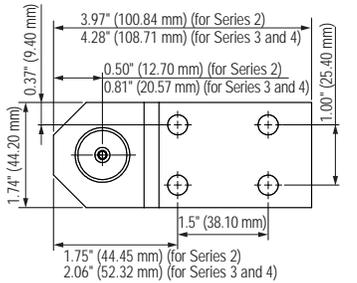
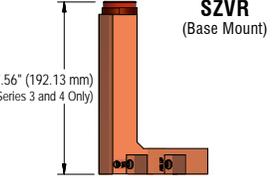
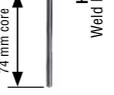
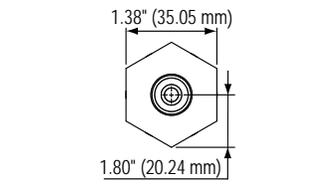
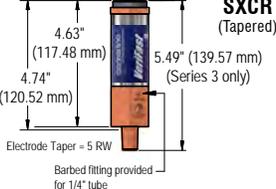
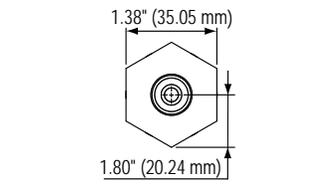
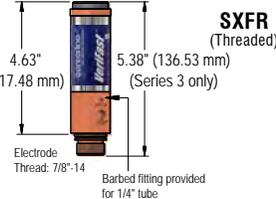
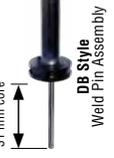
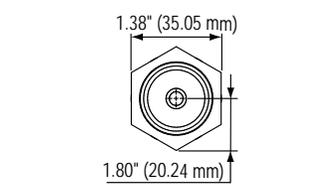
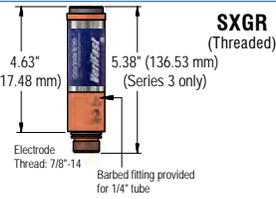
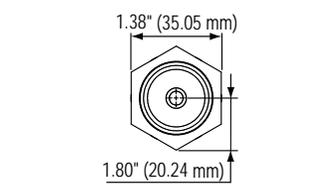
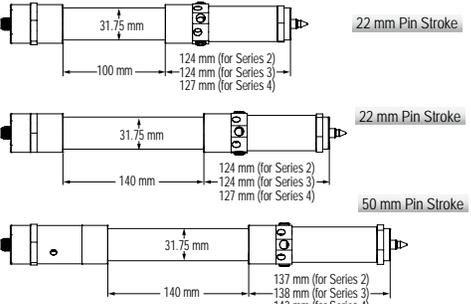
Contact
CL-200-37

VeriFast™ IA Weld Bodies / Pin Styles Quick Reference

No.	VeriFast™ IA Weld Body Style	Insulated Body	Series			Stroke (mm)			Cable Exit Position				Weld Pin Style	Weld Body Foot Print / Other Details					
			2	3	4	22	50	69	Top Left	Top Right	Top Middle	Pre-Defined							
1	 <p>SXAR (Base Mount)</p> <p>3.88" (98.43 mm)</p>	X	✓	✓	✓	✓	X	X	✓	✓	X	X	 <p>31 mm core DB Style Weld Pin Assembly</p>	 <p>3.00" (76.20 mm) 2.38" (60.45 mm) 1.00" (25.40 mm) 1.50" (38.10 mm)</p>					
2	 <p>SXKR (Base Mount)</p> <p>3.88" (98.43 mm) 0.37" (9.40 mm) Contact</p>	✓	✓	✓	✓	✓	X	X	X	X	✓	X			 <p>2.75" (69.85 mm) (for Series 2) 2.94" (74.68 mm) (for Series 3) 3.06" (77.72 mm) (for Series 4) 1.00" (25.40 mm) 1.00" (25.40 mm) 1.74" (44.20 mm) 45° 1.00" (25.40 mm) 2.00" (50.80 mm) 2.25" (57.15 mm)</p>				
3	 <p>SXTR (Base Mount)</p> <p>3.88" (98.43 mm) Barbed fitting provided for 1/4" tube</p>	X	✓	✓	✓	✓	X	X	X	X	✓	X		 <p>1.50" (38.10 mm) 0.31" (7.94 mm) 0.25" (6.35 mm) 0.75" (19.05 mm) 1.50" (38.10 mm) 1.00" (25.40 mm) 2.38" (60.33 mm) 4.00" (101.60 mm) 4.75" (120.65 mm)</p>					
4	 <p>SXQR (Base Mount)</p> <p>3.88" (98.43 mm) 0.37" (9.40 mm) Contact Barbed fitting provided for 1/4" tube</p>	✓	✓	✓	✓	✓	X	X	X	X	✓	X				 <p>2.75" (69.85 mm) 1.15" (29.21 mm) 1.00" (25.40 mm) 1.00" (25.40 mm) 1.75" (44.45 mm) 45° 1.00" (25.40 mm) 2.00" (50.80 mm) 2.25" (57.15 mm)</p>			
5	 <p>SXHR (Base Mount)</p> <p>3.88" (98.43 mm) Through hole (Ø17/32" clearance hole for 1/2" screw) Barbed fittings provided for 1/4" tube</p>	✓	✓	✓	✓	✓	X	X	✓	✓	X	X					 <p>2.75" (69.85 mm) 1.15" (29.21 mm) 1.00" (25.40 mm) 1.00" (25.40 mm) 1.75" (44.45 mm) 45° 1.00" (25.40 mm) 2.00" (50.80 mm) 2.25" (57.15 mm)</p>		
6	 <p>SXJR (Base Mount)</p> <p>3.88" (98.43 mm) Threaded 1/2"-13 UNC Helicoil Barbed fittings provided for 1/4" tube</p>	✓	✓	✓	✓	✓	X	X	✓	✓	X	X						 <p>2.75" (69.85 mm) 1.15" (29.21 mm) 1.00" (25.40 mm) 1.00" (25.40 mm) 1.75" (44.45 mm) 45° 1.00" (25.40 mm) 2.00" (50.80 mm) 2.25" (57.15 mm)</p>	
7	 <p>SXVR (Base Mount)</p> <p>3.88" (98.43 mm) Barbed fitting provided for 1/4" tube</p>	X	✓	X	X	✓	X	X	X	X	✓	X							 <p>2.75" (69.85 mm) 1.15" (29.21 mm) 1.00" (25.40 mm) 1.00" (25.40 mm) 1.75" (44.45 mm) 45° 1.00" (25.40 mm) 2.00" (50.80 mm) 2.25" (57.15 mm)</p>
8	 <p>SXWR (Base Mount)</p> <p>3.88" (98.43 mm) 0.37" (9.40 mm) Contact Barbed fitting provided for 1/4" tube</p>	✓	✓	X	X	✓	X	X	X	X	✓	X							

✓=Recommended X=Not Available ✓=Available, Not Recommended

VeriFast™ IA Weld Bodies / Pin Styles Quick Reference

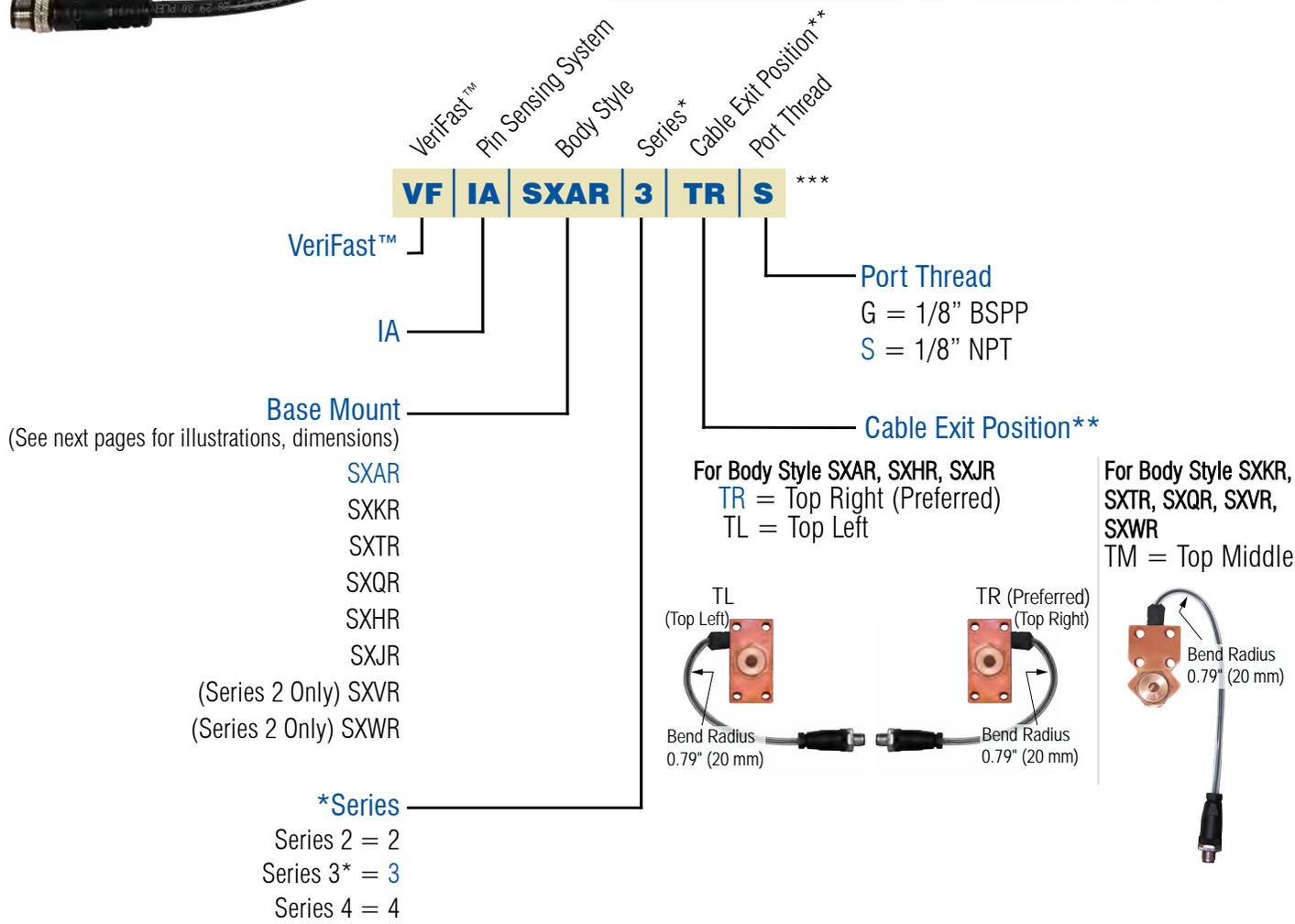
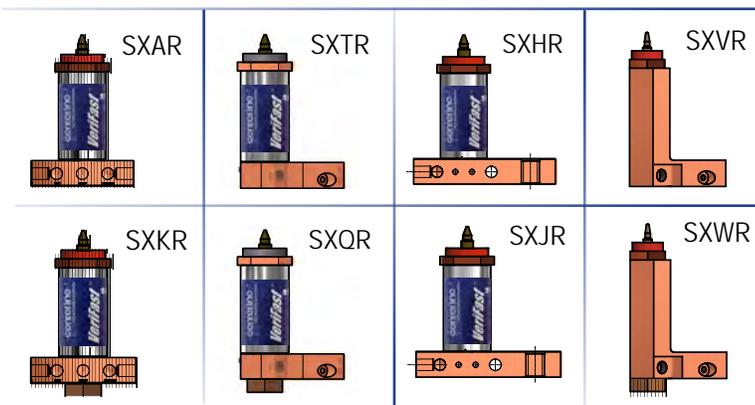
No.	VeriFast™ IA Weld Body Style	Insulated Body	Series			Stroke (mm)			Cable Exit Position				Weld Pin Style	Weld Body Foot Print / Other Details
			2	3	4	22	50	69	Top Left	Top Right	Top Middle	Pre-Defined		
9	 <p>SXZR (Base Mount)</p> <p>Air Port 10-32 UNF (Barbed fitting provided)</p> <p>125.30 mm (for Series 2 and 3) 128.52 mm (for Series 4)</p>	X	✓	✓	✓	X	✓	X	X	X	✓	X	 <p>IA Style Weld Pin</p> <p>SXZR (with IA Cable / Pin) Stick Assembly</p>	 <p>199.66 mm (for Series 2) 204.49 mm (for Series 3) 207.54 mm (for Series 4)</p> <p>12.70 mm (for Series 2) 17.53 mm (for Series 3) 20.57 mm (for Series 4)</p> <p>25.40 mm</p> <p>38.10 mm (for Series 2) 42.93 mm (for Series 3) 45.97 mm (for Series 4)</p>
10	 <p>SYVR (Base Mount)</p> <p>6.77" (172.06 mm)</p>	X	✓	✓	✓	X	✓	X	X	X	✓	X	 <p>HE Style Weld Pin Assembly</p>	 <p>3.97" (100.84 mm) (for Series 2) 4.28" (108.71 mm) (for Series 3 and 4)</p> <p>0.50" (12.70 mm) (for Series 2) 0.81" (20.57 mm) (for Series 3 and 4)</p> <p>1.74" (44.20 mm)</p> <p>0.37" (9.40 mm)</p> <p>1.00" (25.40 mm)</p> <p>1.5" (38.10 mm)</p> <p>1.75" (44.45 mm) (for Series 2) 2.06" (52.32 mm) (for Series 3 and 4)</p>
11	 <p>SZVR (Base Mount)</p> <p>7.56" (192.13 mm) (Series 3 and 4 Only)</p>	X	X	✓	✓	X	X	✓	X	X	✓	X	 <p>DB Style Weld Pin Assembly</p> <p>74 mm core</p>	 <p>1.38" (35.05 mm)</p> <p>1.80" (20.24 mm)</p>
12	 <p>SXCR (Tapered)</p> <p>4.63" (117.48 mm) 4.74" (120.52 mm)</p> <p>5.49" (139.57 mm) (Series 3 only)</p> <p>Electrode Taper = 5 RW</p> <p>Barbed fitting provided for 1/4" tube</p>	X	X	✓	X	✓	X	X	X	X	X	✓	 <p>1.38" (35.05 mm)</p> <p>1.80" (20.24 mm)</p>	
13	 <p>SXFR (Threaded)</p> <p>4.63" (117.48 mm) 5.38" (136.53 mm) (Series 3 only)</p> <p>Electrode Thread: 7/8"-14</p> <p>Barbed fitting provided for 1/4" tube</p>	X	X	✓	X	✓	X	X	X	X	X	✓	 <p>DB Style Weld Pin Assembly</p> <p>31 mm core</p>	 <p>1.38" (35.05 mm)</p> <p>1.80" (20.24 mm)</p>
14	 <p>SXGR (Threaded)</p> <p>4.63" (117.48 mm) 5.38" (136.53 mm) (Series 3 only)</p> <p>Electrode Thread: 7/8"-14</p> <p>Barbed fitting provided for 1/4" tube</p>	X	X	✓	X	✓	X	X	X	X	X	✓	 <p>1.38" (35.05 mm)</p> <p>1.80" (20.24 mm)</p>	
15	 <p>Clamp Mount</p>	X	✓	✓	✓	✓	✓	X	X	X	X	✓	 <p>Tapped Nut / Stud Weld Pins</p>	 <p>22 mm Pin Stroke:</p> <p>31.75 mm</p> <p>100 mm</p> <p>124 mm (for Series 2) 124 mm (for Series 3) 127 mm (for Series 4)</p> <p>22 mm Pin Stroke:</p> <p>31.75 mm</p> <p>140 mm</p> <p>124 mm (for Series 2) 124 mm (for Series 3) 127 mm (for Series 4)</p> <p>50 mm Pin Stroke:</p> <p>31.75 mm</p> <p>140 mm</p> <p>137 mm (for Series 2) 138 mm (for Series 3) 143 mm (for Series 4)</p>

✓=Recommended X=Not Available ✓=Available, Not Recommended

VeriFast™ IA Base Mount Weld Body - 22 mm Stroke

To be used with:

- VeriFast™ IA DB Style Nut or Stud Weld Pins (See pages 39, 40)



* Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are SXVR and SXWR weld bodies, which are Series 2 only. The Series number must be consistent between all components (Body, Pin, and Head).

** To connect to the PLC, the VeriFast™ IA requires a micro (12 mm), 4-pin, shielded, female tool cord, max. 50 ft. (15 m) long.

***Example of VeriFast™ IA Base Mount weld body part number: VF-IA-SXAR3-TR-S

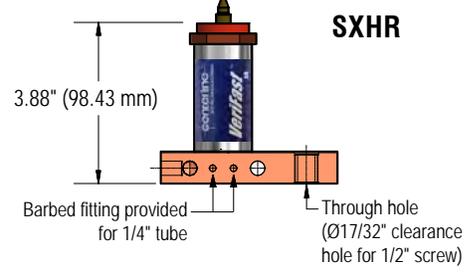
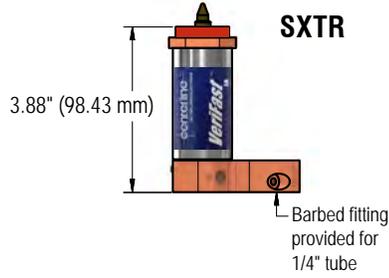
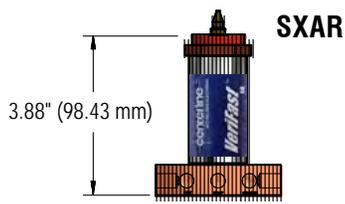
VeriFast™ IA Base Mount Weld Body - 22 mm Stroke

(Continued from the previous page with details of the SX_R field only)

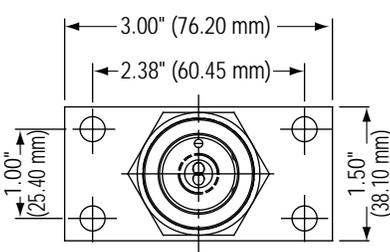


VeriFast
Pin Sensing System
Body Style
Series *
Cable Exit Position **
Port Thread

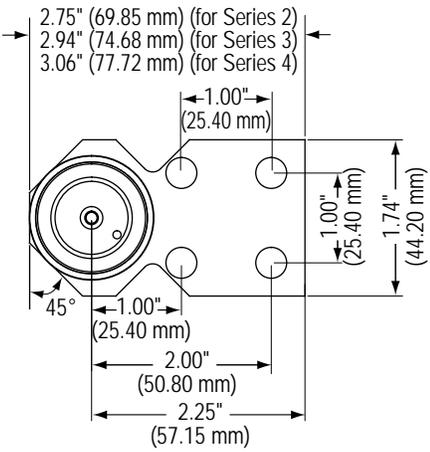
VF	IA	SX_R	3	TR	S	***
----	----	------	---	----	---	-----



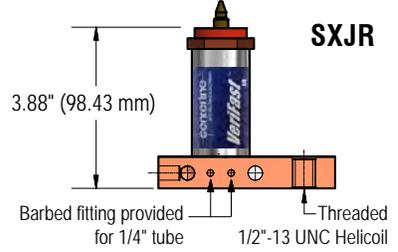
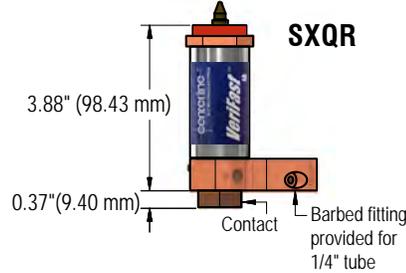
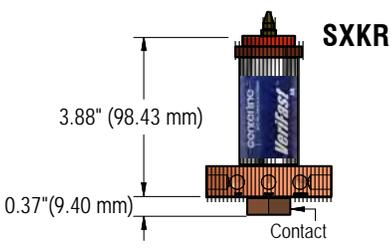
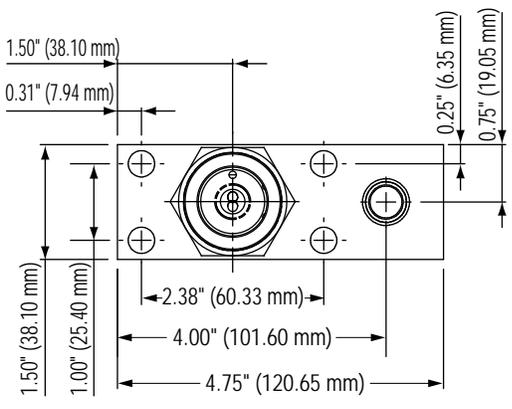
SXAR and SXKR



SXTR and SXQR



SXHR and SXJR



(Continued on the next page)...

* Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are SXVR and SXWR weld bodies, which are Series 2 only. The Series number must be consistent between all components (Body, Pin, and Head).

** To connect to the PLC, the VeriFast IA requires a micro (12 mm), 4-pin, shielded, female tool cord, max. 50 ft. (15 m) long.

*** Example of VeriFast™ IA Base Mount weld body part number: **VF-IA-SXAR3-TR-S**

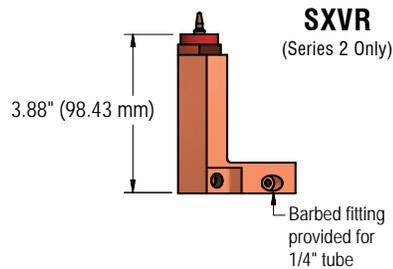
VeriFast™ IA Base Mount Weld Body - 22 mm Stroke

(Continued from the previous page with details of the SX_R field only)

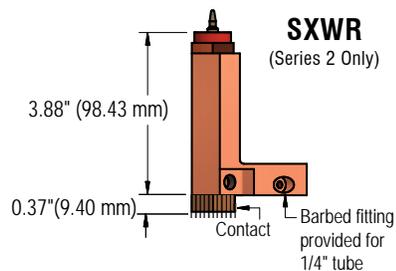
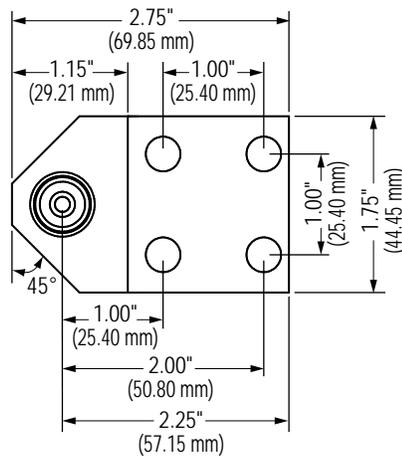


VeriFast
Pin Sensing System
Body Style
Series*
Cable Exit Position**
Port Thread

VF | LVDT | **SX_R** | 3 | TR | S ***



SXVR and SXWR



* Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are SXVR and SXWR weld bodies, which are Series 2 only. The Series number must be consistent between all components (Body, Pin, and Head).

** To connect to the PLC, the VeriFast IA requires a micro (12 mm), 4-pin, shielded, female tool cord, max. 50 ft. (15 m) long.

*** Example of VeriFast™ IA Base Mount weld body part number: **VF-IA-SXAR3-TR-S**

VeriFast™ IA Tapered or Threaded Mount Weld Body - 22 mm Stroke

To be used with:
 • VeriFast™ IA DB Style Nut or Stud Weld Pins (See pages 39, 40)

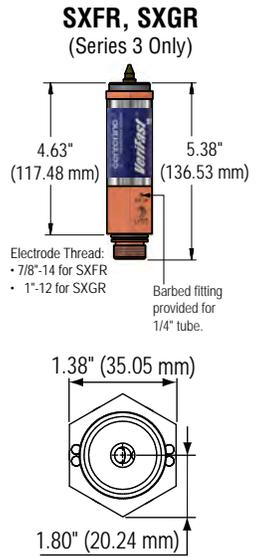
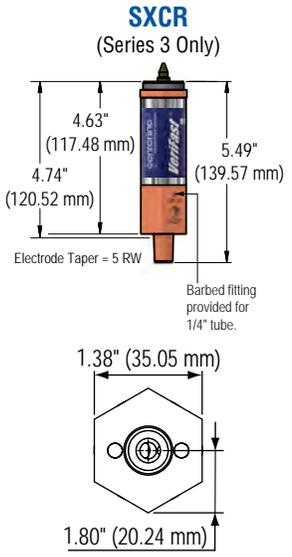


VeriFast™
IA
Body Style
 Tapered = SXCR
 (7/8"-14) Threaded = SXFR
 (1"-12) Threaded = SXGR

Series*
 3 = Series 3* (Only)

Cable Exit Position**
 XX = No option

Port Thread
 S = No option (Barbed fittings provided)

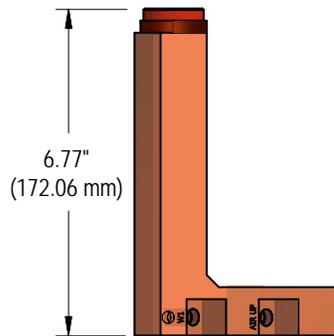
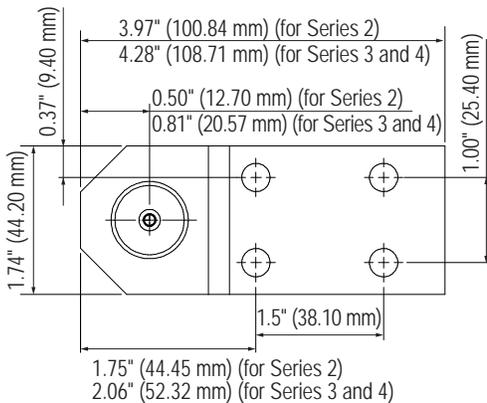
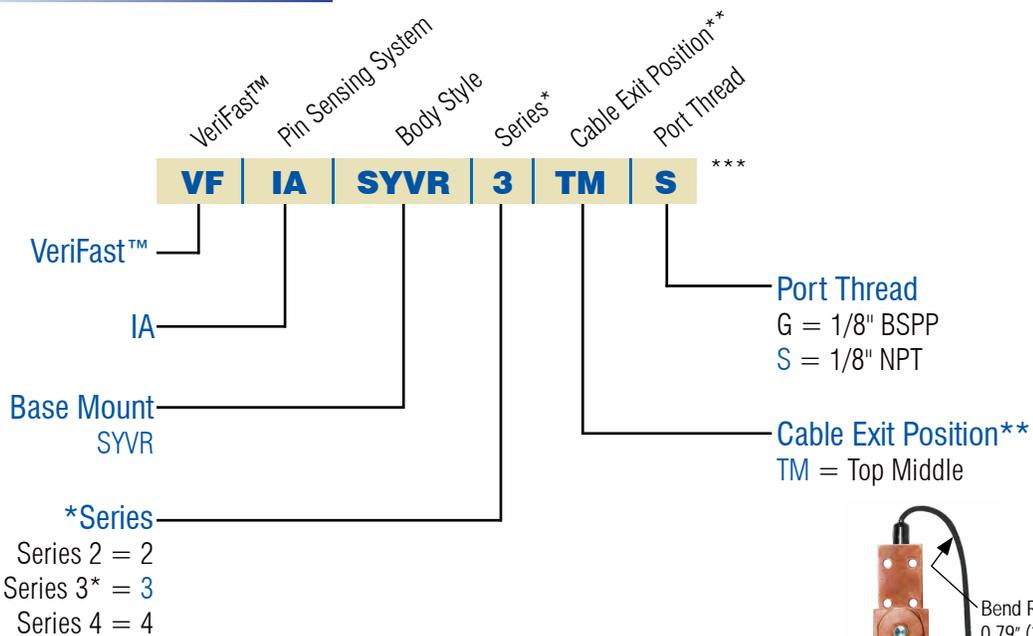


* Tapered (SXCR) and Threaded (SXFR, SXGR) Weld Bodies are Series 3 only and must be consistent with Series 3 of Pin and Head.
 ** To connect to the PLC, the VeriFast™ IA requires a micro (12 mm), 4-pin, shielded, female tool cord, max. 50 ft. (15 m) long.
 *** Example of VeriFast™ IA Tapered weld body part number: **VF-IA-SXCR3-XX-S**

VeriFast™ IA SYVR Base Mount Weld Body - 50 mm Stroke

To be used with:

- VeriFast™ IA HE Style Nut or Stud Weld Pins (See pages 39, 40)



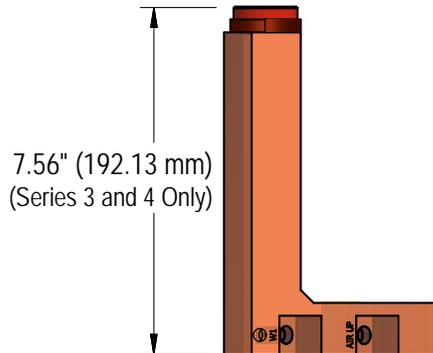
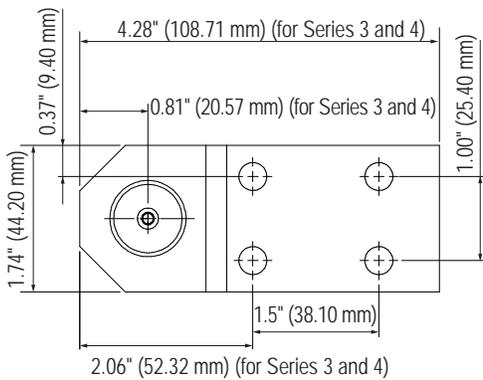
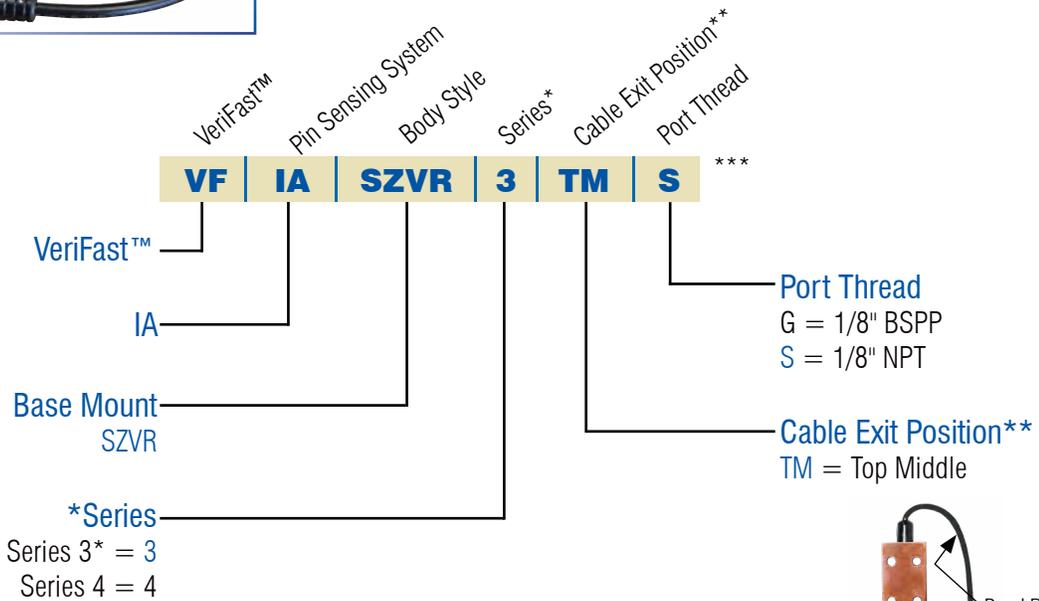
* Series 3 is preferred for all applications, unless clearance or welding issues exist. The Series number must be consistent between all components (Body, Pin, and Head).

** To connect to the PLC, the VeriFast IA requires a micro (12 mm), 4-pin, shielded, female tool cord, max. 50 ft. (15 m) long.

*** Example of VeriFast™ SYVR Base Mount weld body part number: **VF-IA-SYVR3-TM-S**

VeriFast™ IA SZVR Base Mount Weld Body - 69 mm Stroke

To be used with:
 • **VeriFast™ IA HE Style** Nut or Stud Weld Pins (See pages 39, 40)



* Series 3 is preferred for all applications, unless clearance or welding issues exist. The Series number must be consistent between all components (Body, Pin, and Head).

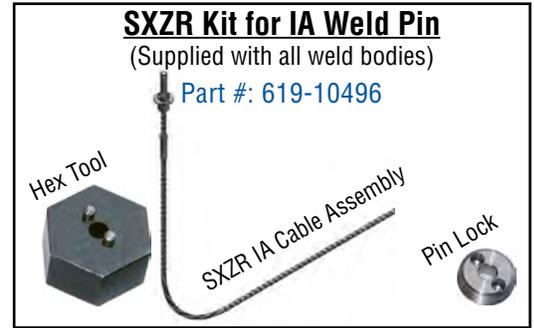
** To connect to the PLC, the VeriFast IA requires a micro (12 mm), 4-pin, shielded, female tool cord, max. 50 ft. (15 m) long.

*** Example of VeriFast™ SZVR Base Mount weld body part number: **VF-IA-SZVR3-TM-S**

VeriFast™ IA SXZR Weld Bodies - 50 mm Stroke

To be used with:

- **VeriFast™ IA** Nut or Stud Weld Pins with XZ IA Cable / Pin Lock Assembly (See page 39, 40)



VeriFast™
Pin Sensing System
Body Style
Series*
Cable Exit Position**
Port Thread

VF IA SXZR 3 TM S ***

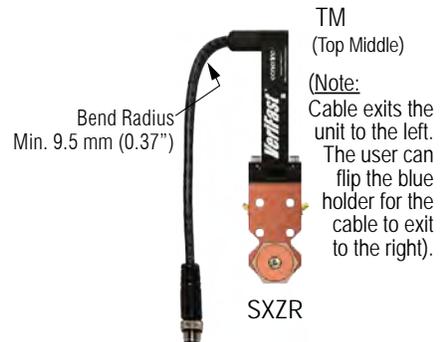
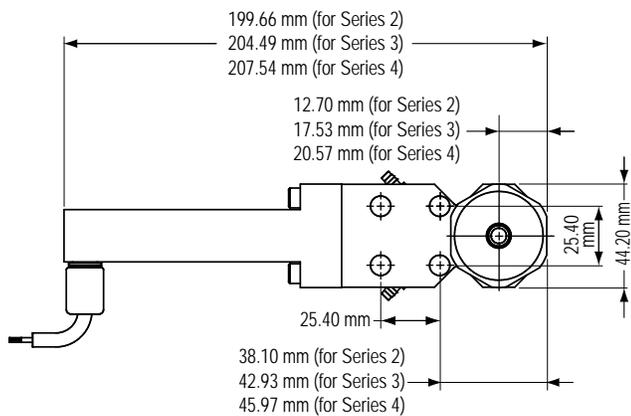
VeriFast™
IA
Body Style
SXZR

*Series
Series 2 = 2
Series 3* = 3
Series 4 = 4

125.30 mm (for Series 2 and 3)
128.52 mm (for Series 4)

Port Thread
G = 1/8" BSPP
S = 1/8" NPT

Cable Exit Position**
TM = Top Middle



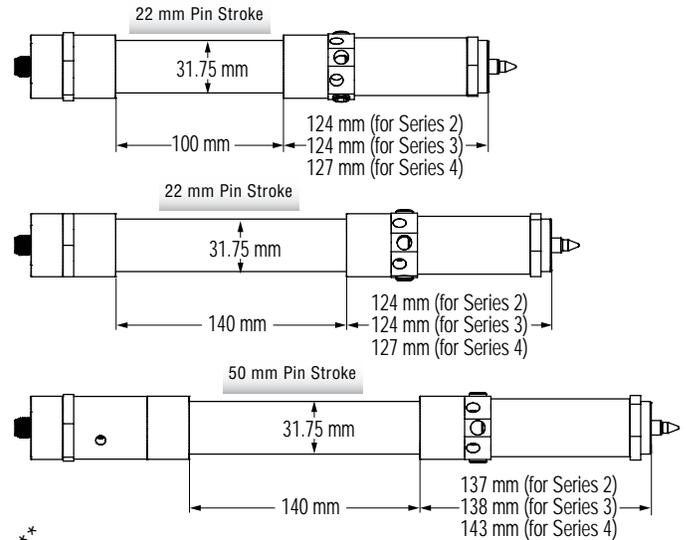
* Series 3 is preferred for all applications, unless clearance or welding issues exist. The Series number must be consistent between all components (Body, Pin, and Head).

** The VeriFast IA requires a micro (12 mm), 4-pin, shielded, female tool cord, max. 50 ft. (15 m) long to connect to your control solution.

***Example of VeriFast™ IA SXZR Base Mount weld body part number: **VF-IA-SXZR3-TM-S**

VeriFast™ IA Clamp Mount Weld Body - 22 mm or 50mm Stroke

To be used with:
 • **VeriFast™ IA Tapped Style Nut or Stud Weld Pins** (See pages 43, 44)



VeriFast™
 Pin Sensing System
 Mounting Style
 Series*
 Pin Stroke Length**
 Adapter Length**

VF | IA | CLMP | 3 | 22 | 140 ***

VeriFast™
 IA
 Clamp Mount
 *Series
 Series 2 = 2
 Series 3* = 3
 Series 4 = 4

Adapter Length**
 (Correlate with "Pin Stroke Length" field below
 For visual representation, see drawings at top page).
 100 (mm) - (Works with 22 mm pin stroke only (not 50mm)).
 140 (mm) - (Works with both 22 mm and 50 mm pin strokes).

Pin Stroke Length**
 (Correlate with "Adapter Length" field above.
 For visual representation, see drawings at top of page).
 22 (mm) - (Works with both 100 mm and 140 mm adapters).
 50 (mm) - (Works with both 140 mm adapter only (not 100mm)).

* Series 3 is preferred for all applications, unless clearance or welding issues exist. The series number must be consistent between all components (Body, Pin, and Head).

** Pin Stroke Length and Adapter Length must be correlated. See drawings at the top of the page.

*** Example of VeriFast™ IA Clamp Mount weld body part number: **VF-IA-CLMP-3-22-140**

Note: The Air Port Thread is 1/8" NPT.

Weld Fastener Application with VeriFast™ IA

A fillable digital copy of this form is available on the CenterLine website. Email the completed form to: customerservice@cntrline.com

Contact name:		Date:	
Company:		Tel:	
End User:		Email:	
Work Station:			
Quantity Desired:			

Disclaimer: It is the sole responsibility of the customer to provide accurate stamping information, including tolerances.

1. Application, Part, and Weld Fastener Information

1.1. Is this an existing application? Yes No If 'Yes', for the existing equipment please specify the following:

Weld Body Part Number:	
Weld Pin Part Number:	
Weld Head Part Number:	
Upper Electrode Part Number:	

1.2. Is this a Nut or Stud application? Nut Stud

1.3. Fastener drawings must be provided with this application, as well as:

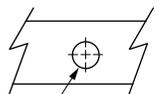
Fastener Part Number:	
Manufacturer:	

1.4. General Details:

Units of Measurement <input type="radio"/> Metric (2 dec.) <input type="radio"/> Imperial (3 dec.)	Part Loading <input type="radio"/> Robot <input type="radio"/> Manual	Fastener Loading <input type="radio"/> Auto <input type="radio"/> Manual	Orientation of projections <input type="radio"/> Down <input type="radio"/> Up
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1.5. Stamping Details:

(Enter the corresponding dimensions below):

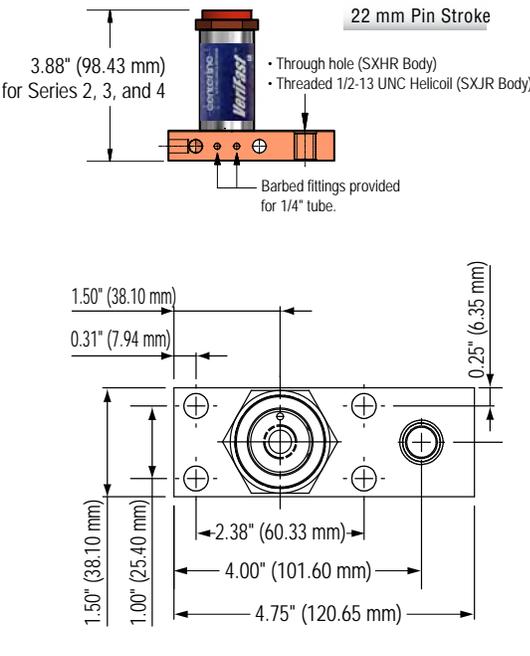
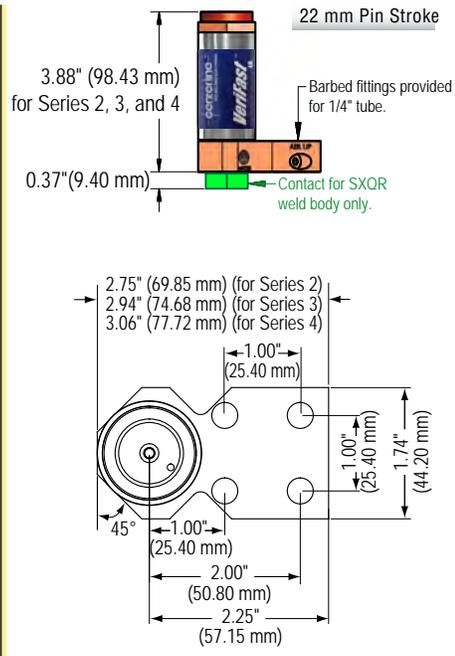
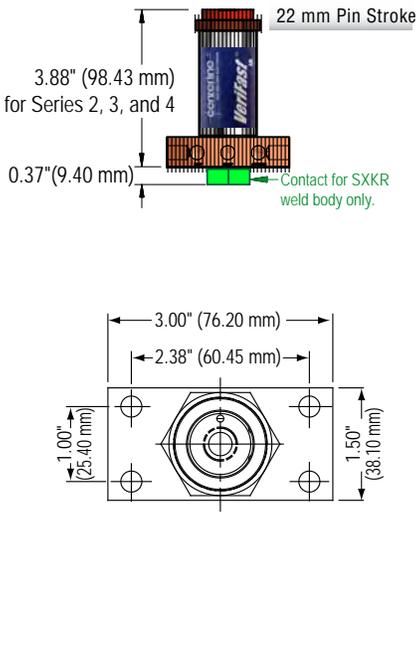
 Min. Hole Diameter In Stamping	 Stamping Thickness

Weld Fastener Application with VeriFast™ IA

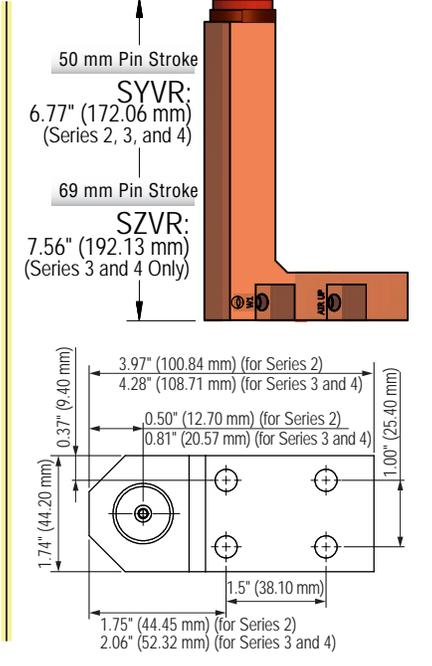
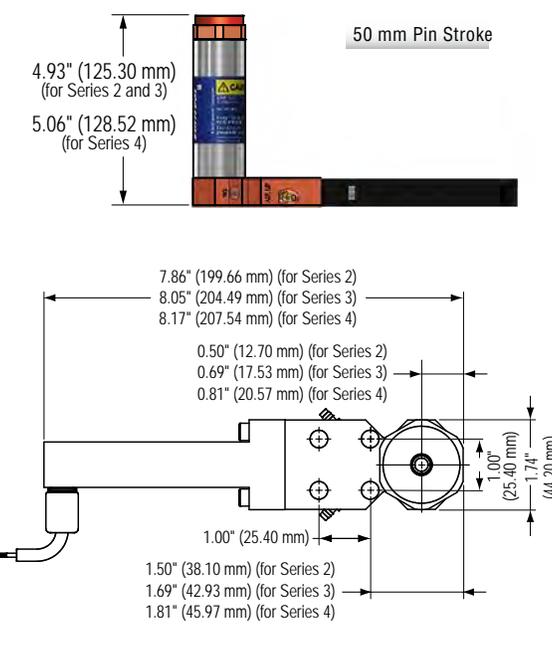
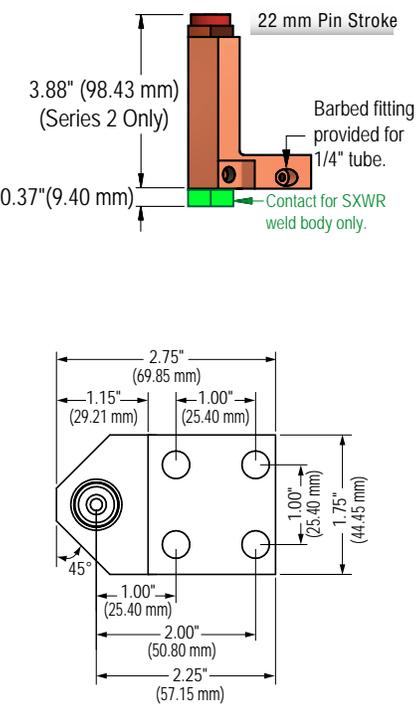
2. VeriFast™ IA Weld Body Information

2.1. Body Style:

- SXAR (Base Mount)
 SXKR (Base Mount)
 SXTR (Base Mount)
 SXQR (Base Mount)
 SXHR (Base Mount)
 SXJR (Base Mount)



- SXVR (Base Mount)
 SXWR (Base Mount)
 SXZR (Base Mount)
 SYVR (Base Mount)
 SZVR (Base Mount)

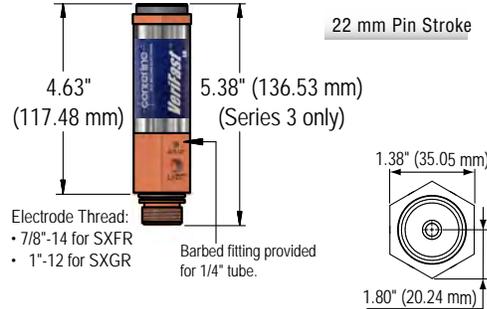
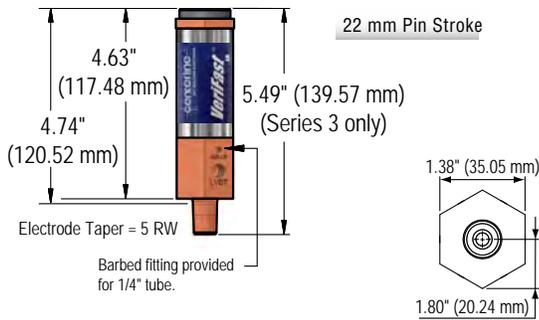


(Continued on next page)

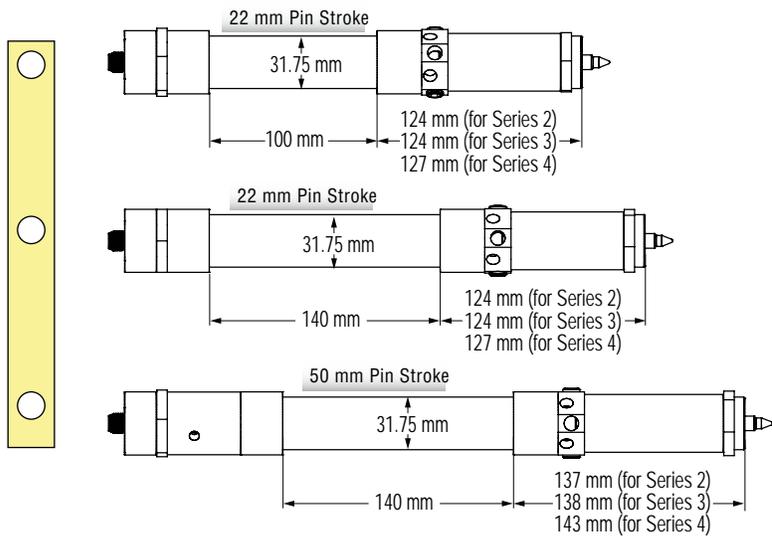
Weld Fastener Application with VeriFast™ IA

(Continued from previous page)

- SXCR** (Tapered)
- SXFR** (Threaded, 7/8"-14)
- SXGR** (Threaded, 1"-12)



◯ **Clamp Mount**

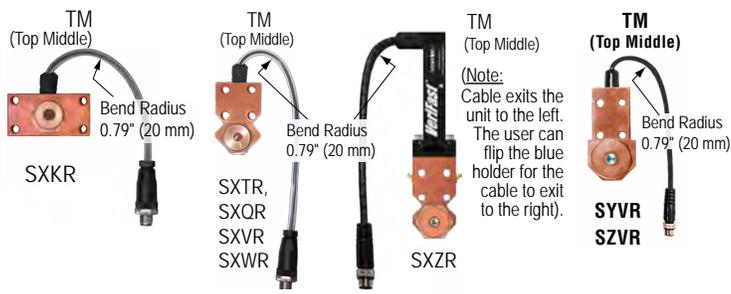


2.2. Cable Exit Position:

- For body style SXAR, SXHR, SXJR
- Top Left
 - Top Right (Preferred)



- For body style SXKR, SXTR, SXQR, SXVR, SXWR, SYVR, SZVR
- Top Middle



- For body style SXCR, SXFR, SXGR, Clamp Mount
- Pre-Defined Position

- ## 2.3. Port Thread † :
- 1/8" BSPP
 - 1/8" NPT

† For Clamp Mount body, NPT port thread only (no BSPP).

Weld Fastener Application with VeriFast™ IA

3. Weld Head Information

Series *

- 2 (0.87" Weld Face Diameter)
 3 (1.25" Weld Face Diameter)
 4 (1.50" Weld Face Diameter)

Material

- RWMA Class 3
 RWMA Class 11

* Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are:

- SXVR and SXWR weld bodies are Series 2 only.
- Tapered (SXCR) and Threaded (SXFR, SXGR) weld bodies are Series 3 only.
- SZVR weld body is Series 3 or Series 4 only.

IMPORTANT: The Series number must be consistent between all components of IA Electrode (Body, Pin, and Head).

4. VeriFast™ IA Weld Pin Information

Type of Pin

- with DB (31 mm) core. (For SXAR, SXKR, SXTR, SXQR, SXHR, SXJR, SXVR, SXWR, SXCR, SXFR, SXGR weld bodies).
 XZ (with IA Cable / Pin Lock Assembly). (For SXZR weld body).
 with HE (74 mm) core. (For SYVR and SZVR weld bodies).
 Tapped Weld Pin (For Clamp Mount weld body).

Use Pin to Locate Stamping

- Yes
 No

Pin Clearance to Stamping

- 0.005 in (0.13 mm)
 0.010 in (0.25 mm)
 Other (Specify)

Pin Material

- DuraPin™ (Recommended)
 Stainless
 Coated

5. Attachment Screws ** ,***:

- Metric (M6 x 1 x 35) Standard (1/4"-20 x 1 1/2") Not Needed

** Insulators are included for SXHR, SXJR, SXKR, SXQR, SXWR weld bodies.

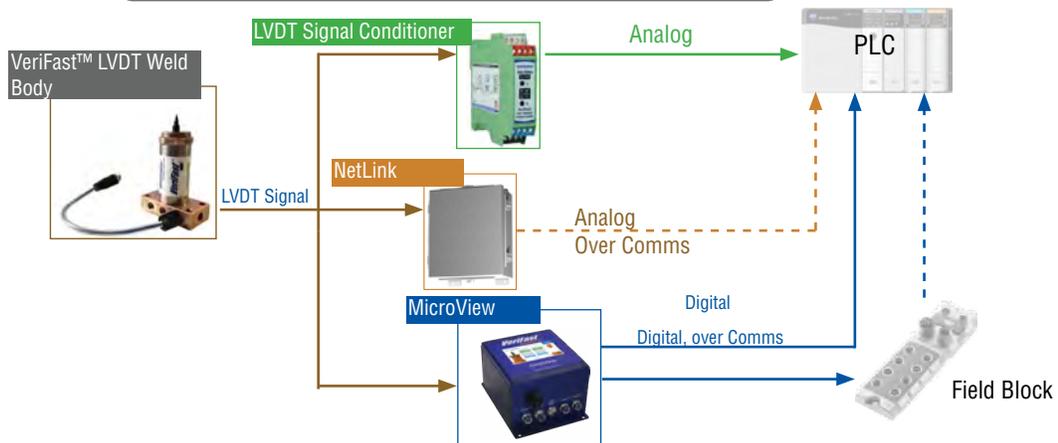
*** SXCR, SXFR, SXGR, and Clamp Mount weld bodies do not use attachment screws.

6. Comments:

Please email completed form to: customerservice@cntrline.com

VeriFast™ LVDT System Overview

System Overview



Establish the part number of each component in the order indicated below.

- 4

BE Electrode



(See pages 46, 47)

- 3

Weld Head



GH Style
 (For **nut** or **stud** welding)



PH Style
 (For **nut** welding; not recommended for stud welding)

(See page 37)

- VeriFast™ LVDT Weld Pin

 36 mm DG Style Nut Weld Pin <small>(See page 41)</small>	 36 mm DG Style Stud Weld Pin <small>(See page 42)</small>	 39 mm DJ Style Nut Weld Pin <small>(See page 41)</small>	 39 mm DJ Style Stud Weld Pin <small>(See page 42)</small>	 76 mm HG Style Nut Weld Pin <small>(See page 41)</small>	 76 mm HG Style Stud Weld Pin <small>(See page 42)</small>	 LVDT Nut Weld Pin <small>(See page 41)</small>	 LVDT Stud Weld Pin <small>(See page 42)</small>	 Elevated Shoulder Style Tapped Nut Weld Pin <small>(See page 43)</small>	 Elevated Shoulder Style Tapped Stud Weld Pin <small>(See page 44)</small>
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- VeriFast™ LVDT Weld Body

Base Mount 22mm Stroke <small>(See page 26)</small>	Tapered (SXCR) 22mm Stroke <small>(See page 29)</small>	Threaded (SXFR, SXGR) 22mm Stroke <small>(See page 29)</small>	SYVR Base Mount 50mm Stroke <small>(See page 30)</small>	SXZR Base Mount 50mm Stroke <small>(See page 31)</small>	Clamp Mount 22 or 50mm Stroke <small>(See page 35)</small>
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Base Mount Body Options

- 5

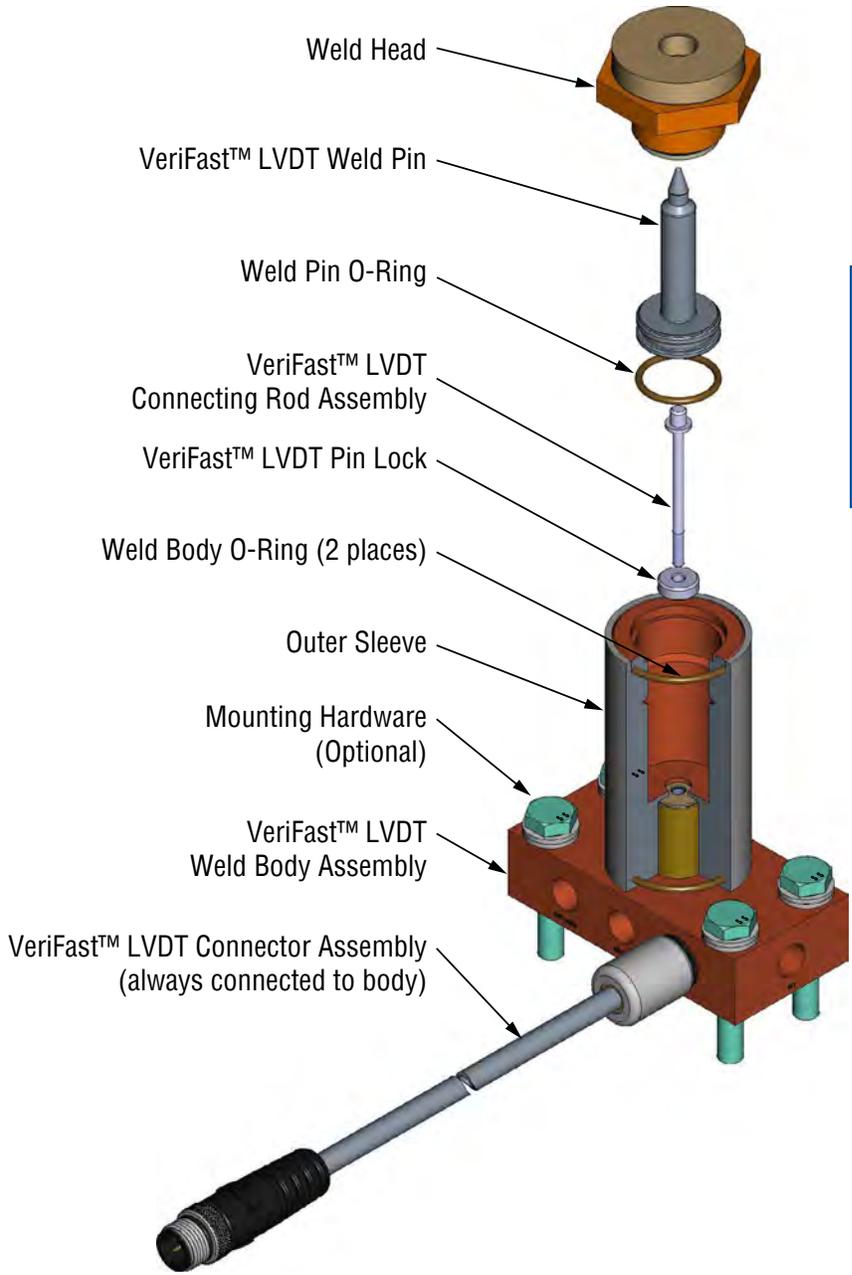
LVDT Signal Conditioner



Required for VeriFast™ LVDT Weld Bodies.
 Part #: VF-LVDT-SC-1

VeriFast™ LVDT Weld Body Components

VeriFast™ LVDT SXAR Weld Body Shown
(Components may vary for other configurations)



NOTE: Replacement stainless steel Outer Sleeves are available as a service part. We recommend replacing the Weld Body O-rings at the same time as the Outer Sleeve. Use Magnalube-G grease for lubrication as required. The Weld Body part number is required at the time of order.

VeriFast™ LVDT Weld Body Assembly

Service Parts (Not including Weld Head or LVDT Weld Pin)



Weld Pin O-Ring
Series 2 - SLORD-013
Series 3 - SLORD-017
Series 4 - SLORD-020



Weld Body O-Ring
Series 2 Body - CL-206
Series 3 Body - CL-306
Series 4 Body - CL-406



Water Connector
RW-1015

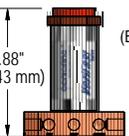
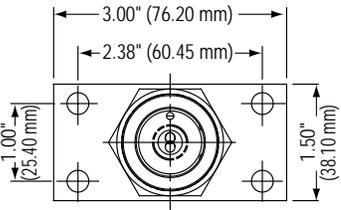
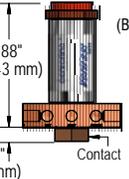
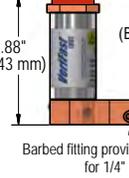
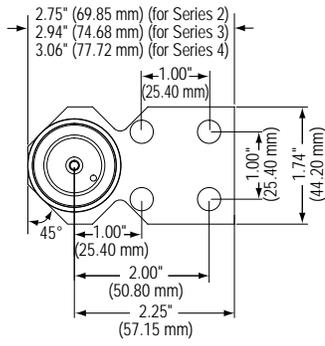
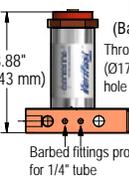
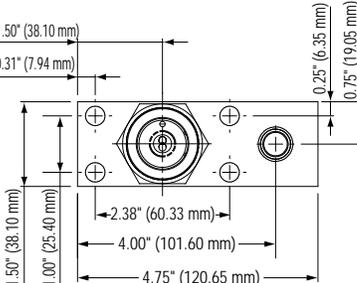
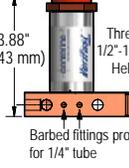
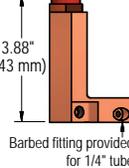
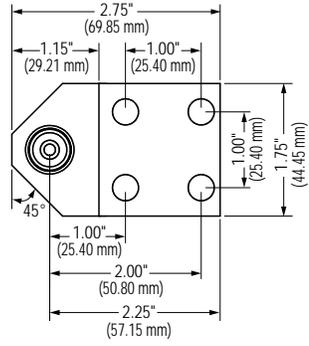
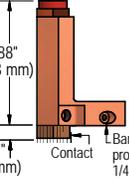


Air Connector
BF1



Contact
CL-200-37

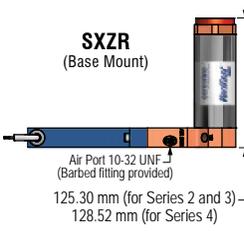
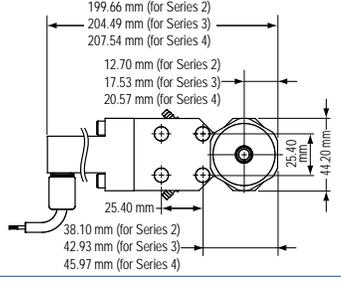
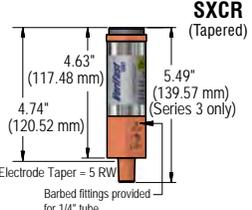
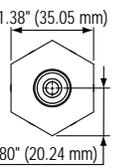
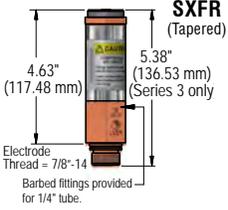
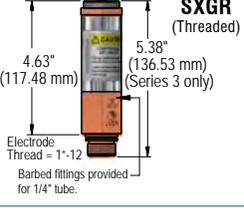
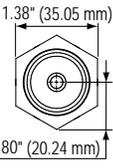
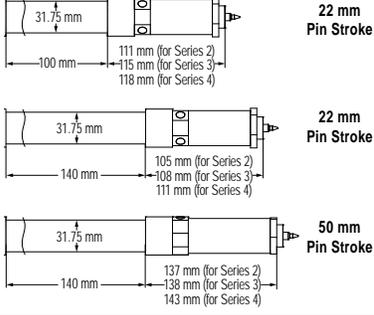
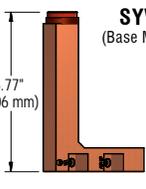
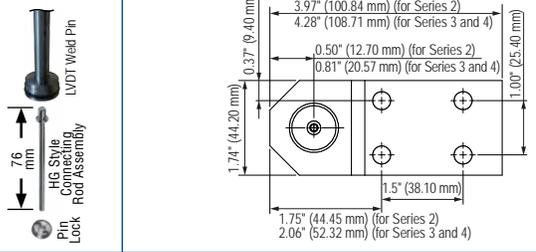
VeriFast™ LVDT Weld Bodies Quick Reference

No.	VeriFast™ LVDT Weld Body Style	Insulated Body	Series					Stroke (mm)				Cable Exit Position				Weld Pin Style	Weld Body Foot Print / Other Details
			2	3	4	22	50	Top Left	Top Right	Top Middle	Pre-Defined	Top Left	Top Right	Top Middle	Pre-Defined		
1	 <p>SXAR (Base Mount)</p> <p>3.88" (98.43 mm)</p>	X	✓	✓	✓	✓	X	✓	✓	X	X						 <p>3.00" (76.20 mm)</p> <p>2.38" (60.45 mm)</p> <p>1.00" (25.40 mm)</p> <p>1.50" (38.10 mm)</p>
2	 <p>SXKR (Base Mount)</p> <p>3.88" (98.43 mm)</p> <p>0.37" (9.40 mm)</p> <p>Contact</p>	✓	✓	✓	✓	X	X	X	✓	X							
3	 <p>SXTR (Base Mount)</p> <p>3.88" (98.43 mm)</p> <p>Barbed fitting provided for 1/4" tube</p>	X	✓	✓	✓	X	X	X	✓	X							 <p>2.75" (69.85 mm) (for Series 2)</p> <p>2.94" (74.68 mm) (for Series 3)</p> <p>3.06" (77.72 mm) (for Series 4)</p> <p>1.00" (25.40 mm)</p> <p>1.00" (25.40 mm)</p> <p>1.74" (44.20 mm)</p> <p>1.00" (25.40 mm)</p> <p>45°</p> <p>2.00" (50.80 mm)</p> <p>2.25" (57.15 mm)</p>
4	 <p>SXQR (Base Mount)</p> <p>3.88" (98.43 mm)</p> <p>0.37" (9.40 mm)</p> <p>Contact</p> <p>Barbed fitting provided for 1/4" tube</p>	✓	✓	✓	✓	X	X	X	✓	X							
5	 <p>SXHR (Base Mount)</p> <p>3.88" (98.43 mm)</p> <p>Through hole (Ø17/32" clearance hole for 1/2" screw)</p> <p>Barbed fittings provided for 1/4" tube</p>	✓	✓	✓	✓	X	✓	✓	X	X							 <p>1.50" (38.10 mm)</p> <p>0.31" (7.94 mm)</p> <p>0.25" (6.35 mm)</p> <p>0.75" (19.05 mm)</p> <p>1.50" (38.10 mm)</p> <p>1.00" (25.40 mm)</p> <p>2.38" (60.33 mm)</p> <p>4.00" (101.60 mm)</p> <p>4.75" (120.65 mm)</p>
6	 <p>SXJR (Base Mount)</p> <p>3.88" (98.43 mm)</p> <p>Threaded 1/2"-13 UNC Helicoil</p> <p>Barbed fittings provided for 1/4" tube</p>	✓	✓	✓	✓	X	✓	✓	X	X							
7	 <p>SXVR (Base Mount)</p> <p>3.88" (98.43 mm)</p> <p>Barbed fitting provided for 1/4" tube</p>	X	✓	X	X	✓	X	X	✓	X							 <p>2.75" (69.85 mm)</p> <p>1.15" (29.21 mm)</p> <p>1.00" (25.40 mm)</p> <p>1.00" (25.40 mm)</p> <p>1.00" (25.40 mm)</p> <p>1.75" (44.45 mm)</p> <p>45°</p> <p>2.00" (50.80 mm)</p> <p>2.25" (57.15 mm)</p>
8	 <p>SXWR (Base Mount)</p> <p>3.88" (98.43 mm)</p> <p>0.37" (9.40 mm)</p> <p>Contact</p> <p>Barbed fitting provided for 1/4" tube</p>	✓	✓	X	X	✓	X	X	✓	X							



✓=Recommended X=Not Available ✓=Available, Not Recommended

VeriFast™ LVDT Weld Bodies Quick Reference

No.	VeriFast™ LVDT Weld Body Style	Insulated Body	Series			Stroke (mm)		Cable Exit Position				Weld Pin Style	Weld Body Foot Print / Other Details
			2	3	4	22	50	Top Left	Top Right	Top Middle	Pre-Defined		
9	 <p>SXZR (Base Mount)</p> <p>Air Port 10-32 UNF (Barbed fitting provided)</p> <p>125.30 mm (for Series 2 and 3) 128.52 mm (for Series 4)</p>	X	✓	✓	✓	X	✓	X	X	✓	X		
10	 <p>SXCR (Tapered)</p> <p>4.63" (117.48 mm) 4.74" (120.52 mm)</p> <p>5.49" (139.57 mm) (Series 3 only)</p> <p>Electrode Taper = 5 RW Barbed fittings provided for 1/4" tube.</p>	X	X	✓	X	✓	X	X	X	X	✓		
11	 <p>SXFR (Tapered)</p> <p>4.63" (117.48 mm) 5.38" (136.53 mm) (Series 3 only)</p> <p>Electrode Thread = 7/8"-14 Barbed fittings provided for 1/4" tube.</p>	X	X	✓	X	✓	X	X	X	X	✓		
12	 <p>SXGR (Threaded)</p> <p>4.63" (117.48 mm) 5.38" (136.53 mm) (Series 3 only)</p> <p>Electrode Thread = 1"-12 Barbed fittings provided for 1/4" tube.</p>	X	X	✓	X	✓	X	X	X	X	✓		
13	 <p>Clamp Mount</p>	X	✓	✓	✓	✓	X	X	X	✓			
14	 <p>SYVR (Base Mount)</p> <p>6.77" (172.06 mm)</p>	X	✓	✓	✓	X	✓	X	X	✓	X		

✓=Recommended X=Not Available ✓=Available, Not Recommended

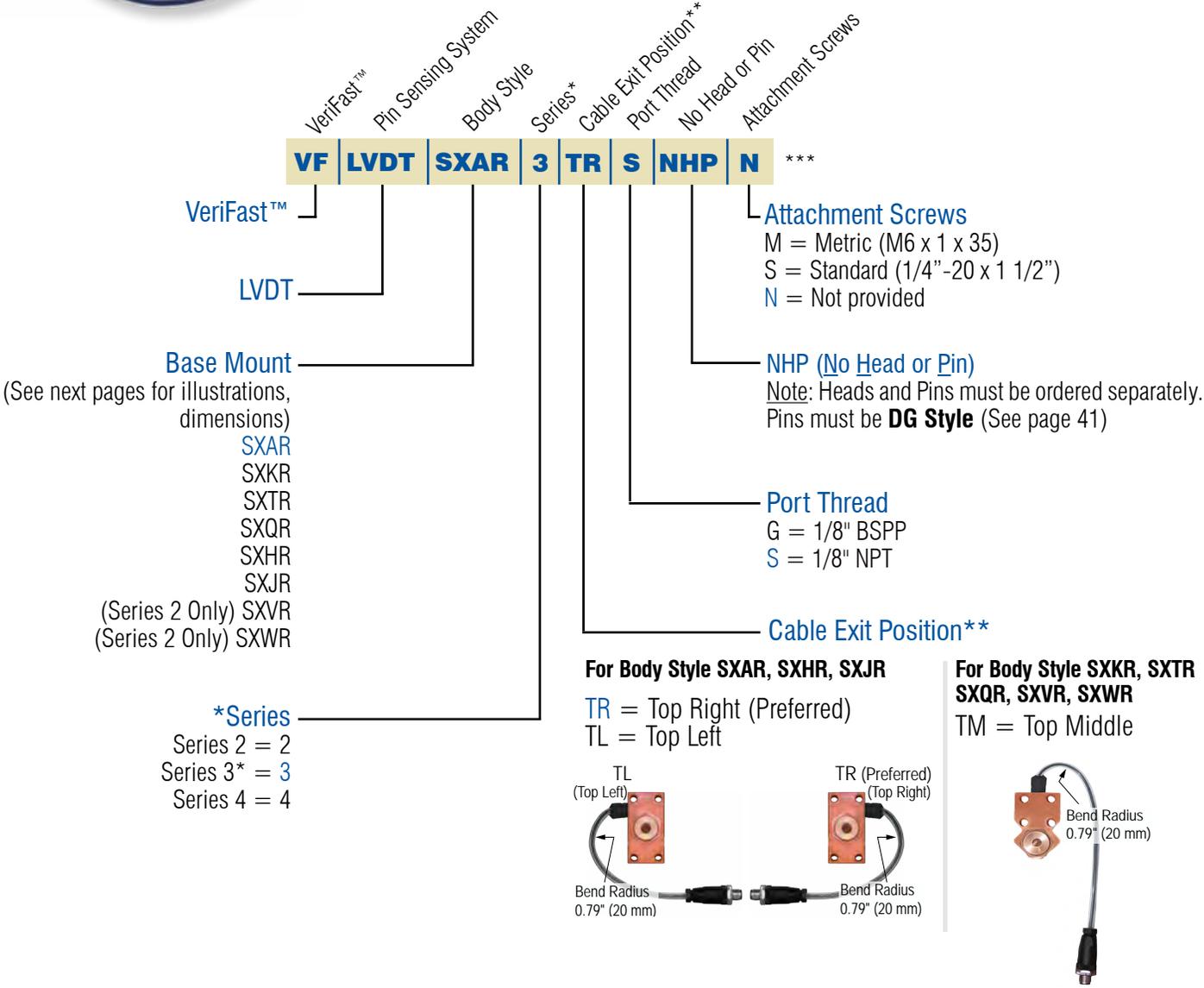
VeriFast™ LVDT Base Mount Weld Body - 22 mm Stroke

To be used with:
 • **VeriFast™ LVDT DG Style Nut or Stud Weld Pins** (See page 41)



DG Kit for LVDT Weld Pin
 (Supplied with all weld bodies)
Part #: 606-43000

Hex Tool
 DG (36mm) Connecting Rod Assembly
 Pin Lock



* Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are SXVR and SXWR weld bodies, which are Series 2 only. The Series number must be consistent between all components (Body, Pin, and Head).

** A micro (12 mm), 5-pin, shielded, female tool cord is required to connect each VeriFast™ LVDT weld body to the Signal Conditioner, MicroView, or NetLink. **The Signal Conditioner must be calibrated once the system is installed in place.**

*** Example of VeriFast™ LVDT Base Mount weld body part number: **VF-LVDT-SXAR3-TR-S-NHP-N**

VeriFast™ LVDT Base Mount Weld Body - 22 mm Stroke

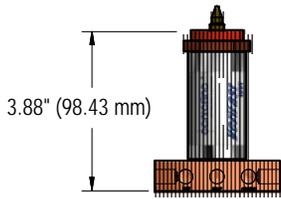
(Continued from the previous page with details of the SX_R field only)



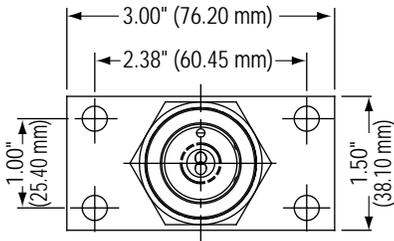
VeriFast
Pin Sensing System
Body Style
Series*
Cable Exit Position**
Port Thread
No Head or Pin
Attachment Screws

VF LVDT SX_R 3 TR S NHP N

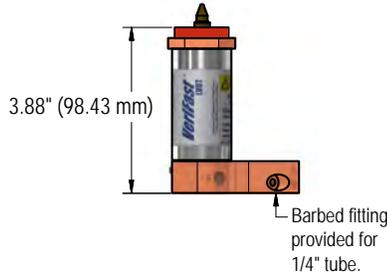
SXAR



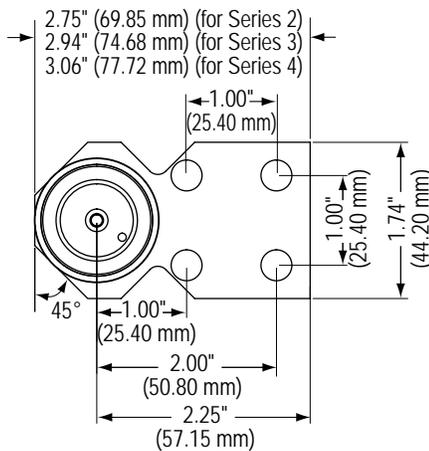
SXAR and SXKR



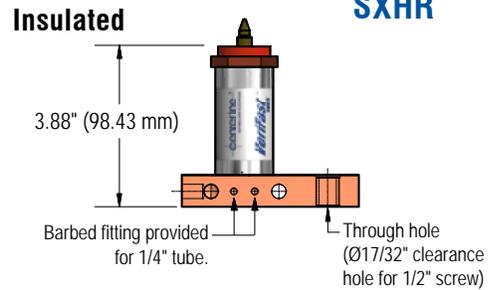
SXTR



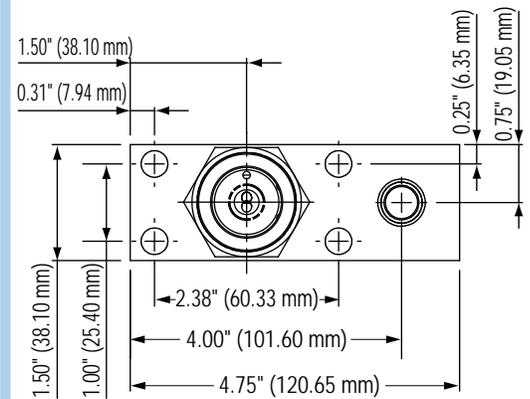
SXTR and SXQR



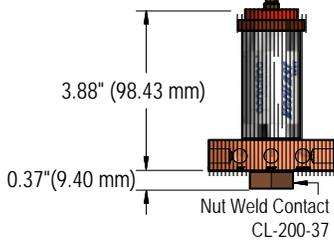
SXHR



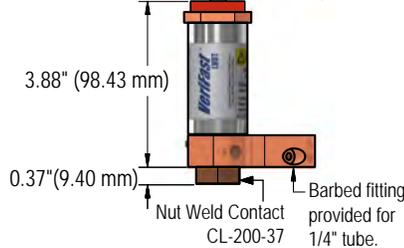
SXHR and SXJR



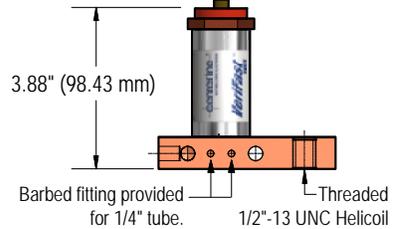
Insulated SXKR



Insulated SXQR



Insulated SXJR



(Continued on the next page)...

*Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are SXVR and SXWR weld bodies, which are Series 2 only. The Series number must be consistent between all components (Body, Pin, and Head).

** To connect to the Signal Conditioner, MicroView or NetLink the VeriFast LVDT requires a micro (12 mm), 5-pin, shielded, female tool cord. **IMPORTANT: A Signal Conditioner, MicroView or NetLink is required for each weld body, with the exception of interchangeable tooling.**

VeriFast™ LVDT Base Mount Weld Body - 22 mm Stroke

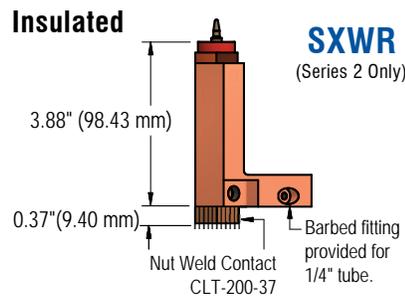
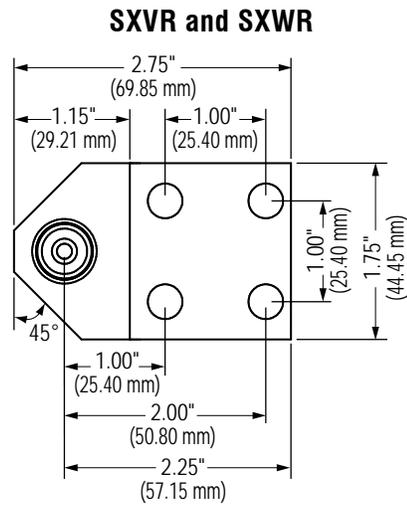
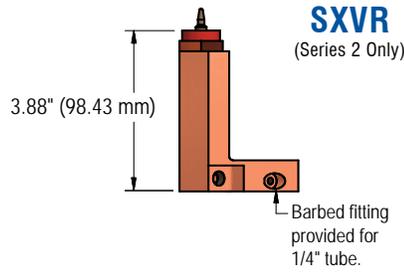
(Continued from the previous page with details of the SX_R field only)



...(Continued from the previous page)

VeriFast Pin Sensing System
Body Style Series Cable Exit Position**
Port Thread No Head or Pin Attachment Screws

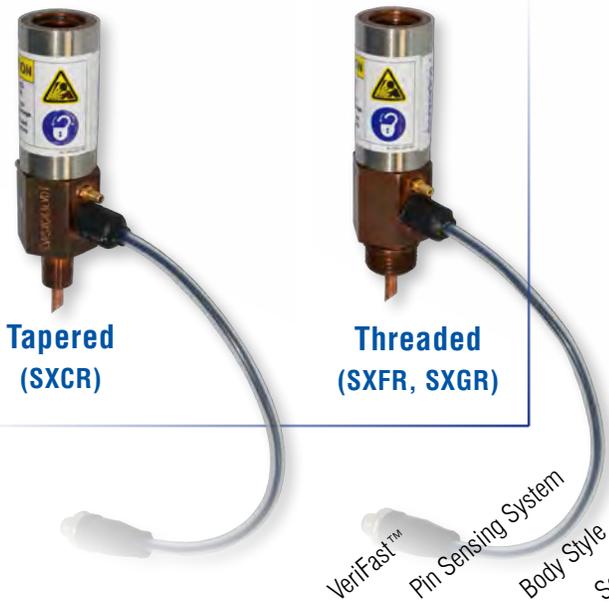
VF LVDT SX_R 2 TM S NHP N



** To connect to the Signal Conditioner, MicroView or NetLink the VeriFast LVDT requires a micro (12 mm), 5-pin, shielded, female tool cord.
IMPORTANT: A Signal Conditioner, MicroView or NetLink is required for each weld body, with the exception of interchangeable tooling.

VeriFast™ LVDT Tapered & Threaded Weld Body - 22 mm Stroke

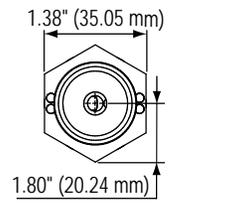
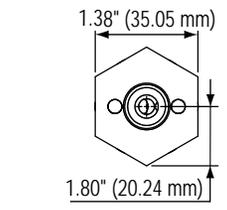
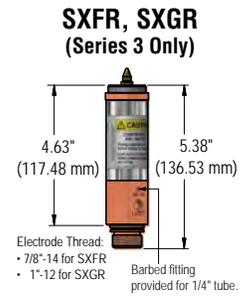
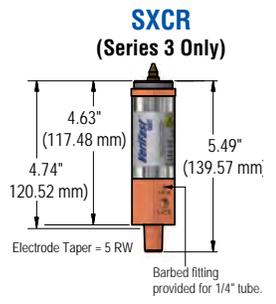
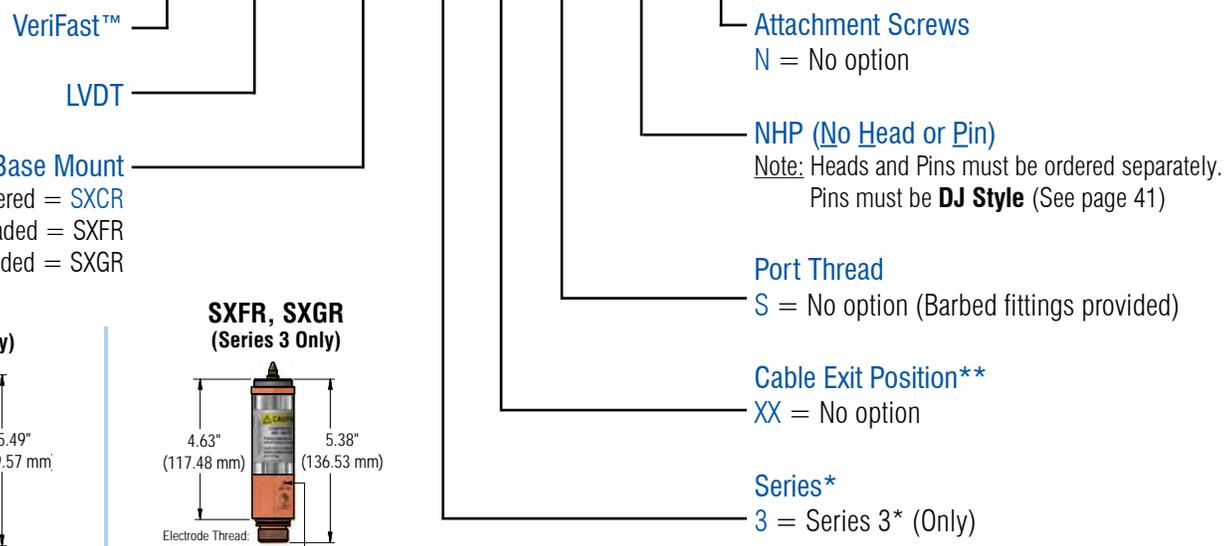
To be used with:
 • **VeriFast™ LVDT DJ Style** Nut or Stud Weld Pins (See page 41)



DJ Kit for LVDT Weld Pin
 (Supplied with all weld bodies)
 Part #: 607-75089

VeriFast™ Pin Sensing System
 Body Style
 Series*
 Cable Exit Position**
 Port Thread
 No Head or Pin
 Attachment Screws

VF | LVDT | SXCR | 3 | XX | S | NHP | N ***



* Tapered (SXCR) and Threaded (SXFR, SXGR) Weld Bodies are Series 3 only and must be consistent with Series 3 of Pin and Head.
 ** A micro (12 mm), 5-pin, shielded, female tool cord is required to connect each VeriFast™ LVDT weld body to the Signal Conditioner, MicroView, or NetLink. **The Signal Conditioner must be calibrated once the system is installed in place. For Signal Conditioner information, see page**
 *** Example of VeriFast™ LVDT Tapered weld body part number: **VF-LVDT-SXCR3-XX-S-NHP-N**

VeriFast™ LVDT SYVR Weld Bodies - 50 mm Stroke

To be used with:

- VeriFast™ LVDT HG Style Nut or Stud Weld Pins (See pages 41, 42)



HG Kit for LVDT Weld Pin

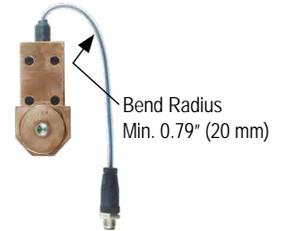
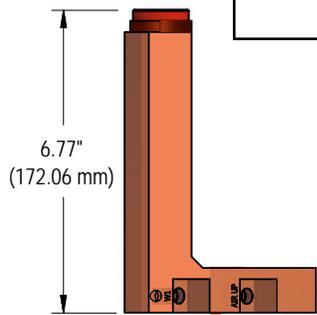
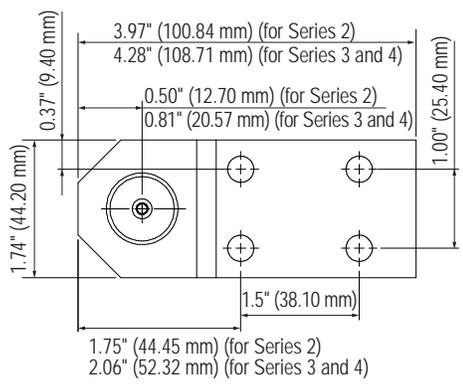
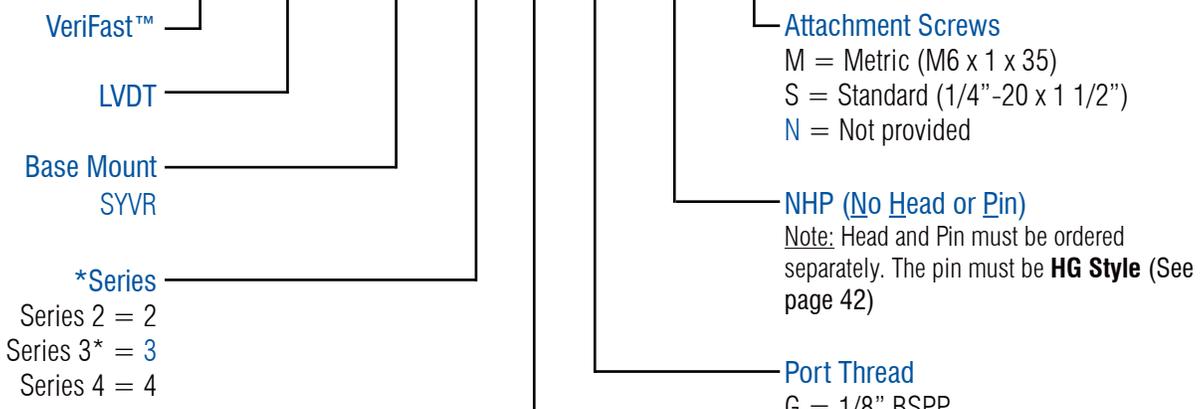
(Supplied with all weld bodies)

Part #: 608-59383



VeriFast™ Pin Sensing System Body Style Series* Cable Exit Position** Port Thread No Head or Pin Attachment Screws

VF | LVDT | SYVR | 3 | TM | S | NHP | N ***



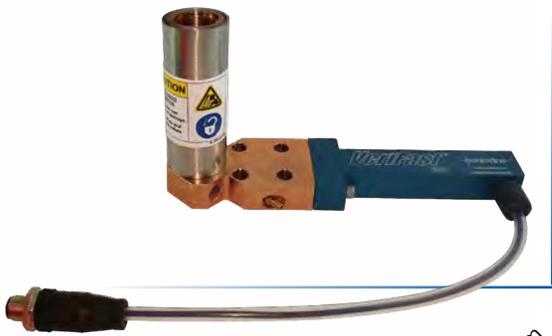
* Series 3 is preferred for all applications, unless clearance or welding issues exist. The Series number must be consistent between all components (Body, Pin, and Head).

** To connect to the Signal Conditioner, the VeriFast LVDT requires a micro (12 mm), 5-pin, shielded, female tool cord.
IMPORTANT: A Signal Conditioner, MicroView or NetLink is required for each VeriFast LVDT weld body, with the exception of interchangeable tooling.
The Signal Conditioner must be calibrated once the system is installed in place.

*** Example of VeriFast™ LVDT SYVR Base Mount weld body part number: **VF-LVDT-SYVR3-TM-S-NHP-N**

VeriFast™ LVDT SXZR Weld Bodies - 50 mm Stroke

To be used with:
 • **VeriFast™ LVDT Nut or Stud Weld Pins** with XZ LVDT Cable / Pin Lock Assembly (See pages 41, 42)

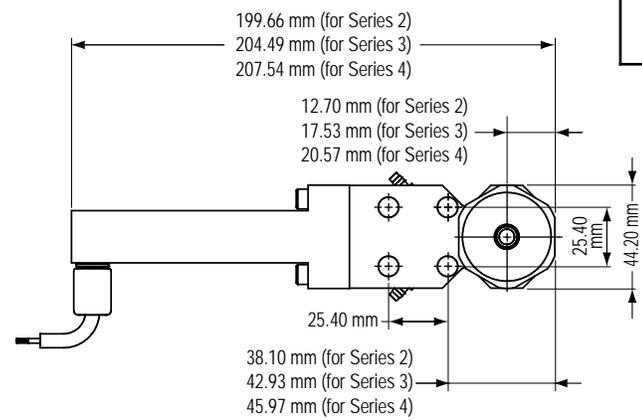


VeriFast™ Pin Sensing System
 Body Style
 Series*
 Cable Exit Position**
 Port Thread
 No Head or Pin
 Attachment Screws

VF LVDT SXZR 3 TM S NHP N ***

VeriFast™
 LVDT
 Body Style
 SXZR

*Series
 Series 2 = 2
 Series 3* = 3
 Series 4 = 4



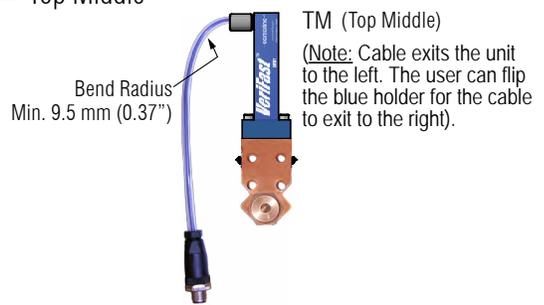
Attachment Screws
 M = Metric (M6 x 1 x 35)
 S = Standard (1/4" -20 x 1 1/2")
 N = Not provided

NHP (No Head or Pin)

Note: Head and Pin must be ordered separately. The pin must be **LVDT Nut or Stud Weld Pin** (with XZ LVDT Cable / Pin Lock Assembly) (See page 42).

Port Thread
 G = 1/8" BSPP
 S = 1/8" NPT

Cable Exit Position**
 TM = Top Middle



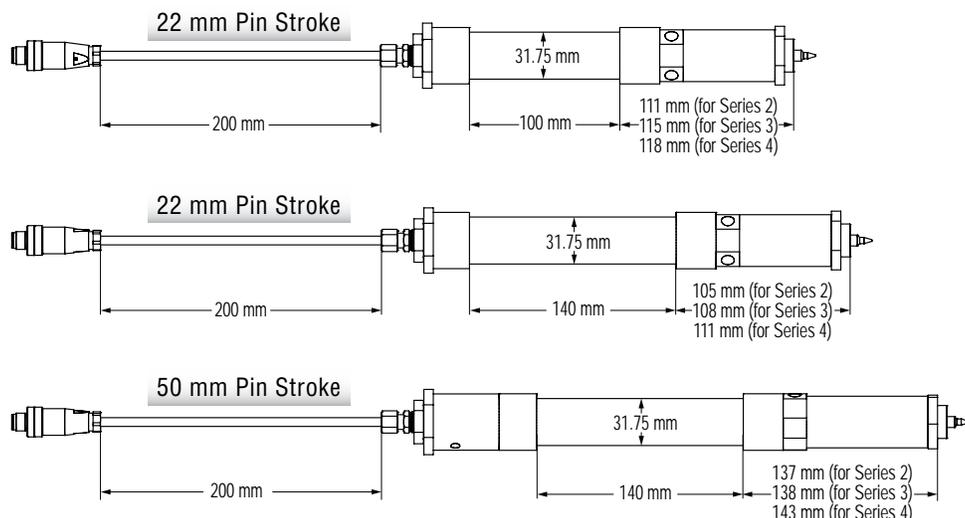
* Series 3 is preferred for all applications, unless clearance or welding issues exist. The Series number must be consistent between all components (Body, Pin, and Head).

** To connect to the Signal Conditioner, the VeriFast™ LVDT requires a micro (12 mm), 5-pin, shielded, female tool cord.
IMPORTANT: A Signal Conditioner, MicroView or NetLink is required for each VeriFast™ LVDT weld body, with the exception of interchangeable tooling.

*** Example of VeriFast™ LVDT SXZR Base Mount weld body part number: **VF-LVDT-SXZR3-TM-S-NHP-N**

VeriFast™ LVDT Clamp Mount Weld Bodies - 22mm or 50 mm Stroke

To be used with:
 • VeriFast™ LVDT Tapped Style Nut or Stud Weld Pins (See pages 43, 44)



VeriFast™
 Pin Sensing System
 Mounting Style
 Series*
 Pin Stroke Length
 Adapter Length
 No Head or Pin

VF LVDT CLMP 3 22 140 NHP ***

VeriFast™
 LVDT
 Clamp Mount
 *Series
 Series 2 = 2
 Series 3* = 3
 Series 4 = 4

NHP (No Head or Pin)
 Note: Heads and Pins must be ordered separately. Pins must be **Tapped** pins (See page 42).

Adapter Length
 (Correlate with "Pin Stroke Length" field below. For visual representation, see drawings at top page).
 100 (mm) - For 22 mm pin stroke only (not 50mm).
 140 (mm) - For both 22 mm and 50 mm pin strokes.

Pin Stroke Length**
 (Correlate with "Adapter Length" field above. For visual representation, see drawings at top of page).
 22 (mm) - For both 100 mm and 140 mm adapters.
 50 (mm) - For 140 mm adapter only (not 100mm).

* Series 3 is preferred for all applications, unless clearance or welding issues exist. The Series number must be consistent between all components (Body, Pin, and Head).

** A micro (12mm), 5-pin, shielded, female tool cord is required to connect each VeriFast™ LVDT weld body to the Signal Conditioner, MicroView, or NetLink. **The Signal Conditioner must be calibrated once the system is installed in place.**

*** Example of VeriFast™ LVDT Clamp Mount weld body part number: **VF-LVDT-CLMP-3-22-140-NHP**

Note: The Air Port Thread is 1/8" NPT.

Weld Fastener Application with VeriFast™ LVDT

A fillable digital copy of this form is available on the CenterLine website. Email the completed form to: customerservice@cntrline.com

Contact name (Required):	Date:
Company (Required):	Tel:
End User:	Email:
Work Station:	
Quantity Desired:	

Disclaimer: It is the sole responsibility of the customer to provide accurate stamping information, including tolerances.

1. Application, Part, and Weld Fastener Information

1.1. Is this an existing application? Yes No

If 'Yes', for the existing equipment please specify the following:

Weld Body Part Number:	
Weld Pin Part Number:	
Weld Head Part Number:	
Upper Electrode Part Number:	

1.2. Is this a Nut or Stud application? Nut Stud

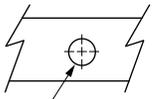
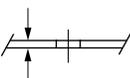
1.3. Fastener drawings must be provided with this application, as well as:

Fastener Part Number (Required):	
Manufacturer (Required):	

1.4. General Details:

Units of Measurement <input type="radio"/> Metric (2 dec.) <input type="radio"/> Imperial (3 dec.)	Part Loading <input type="radio"/> Robot <input type="radio"/> Manual	Fastener Loading <input type="radio"/> Auto <input type="radio"/> Manual	Orientation of projections <input type="radio"/> Down <input type="radio"/> Up
--	---	--	--

1.5. Stamping Details: (Enter the corresponding dimensions below):

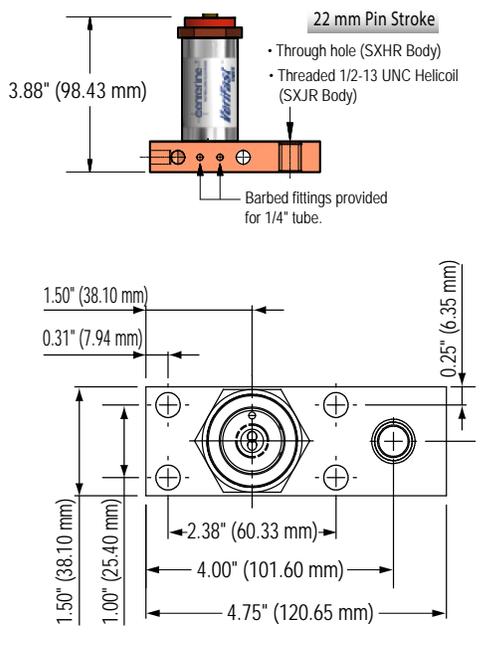
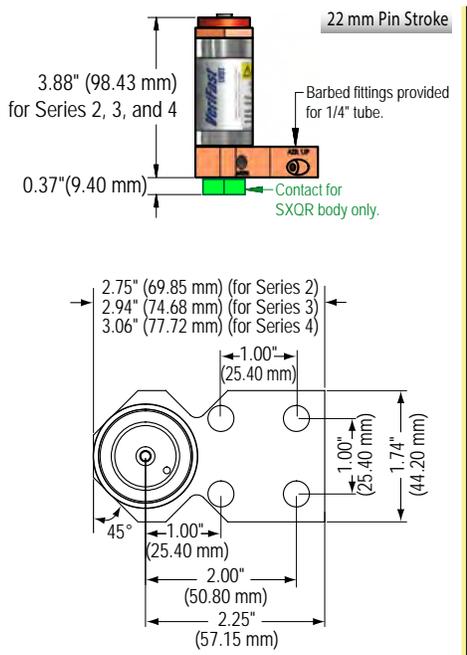
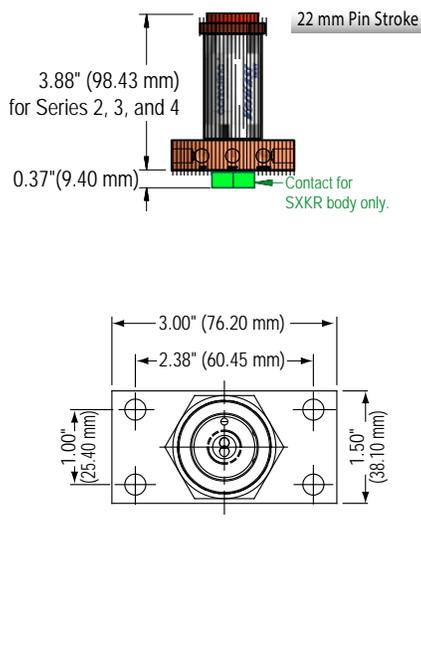
 Min. Hole Diameter In Stamping	 Stamping Thickness

Weld Fastener Application with VeriFast™ LVDT

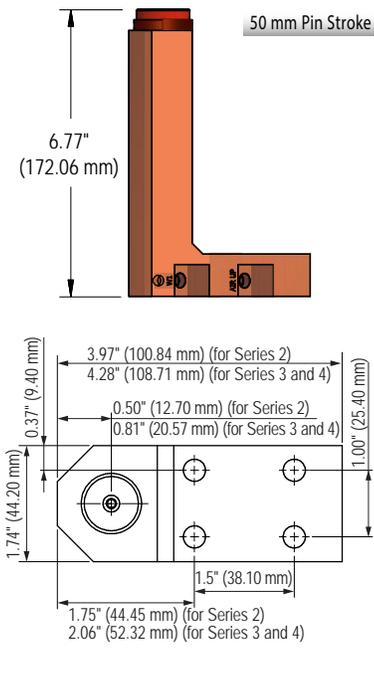
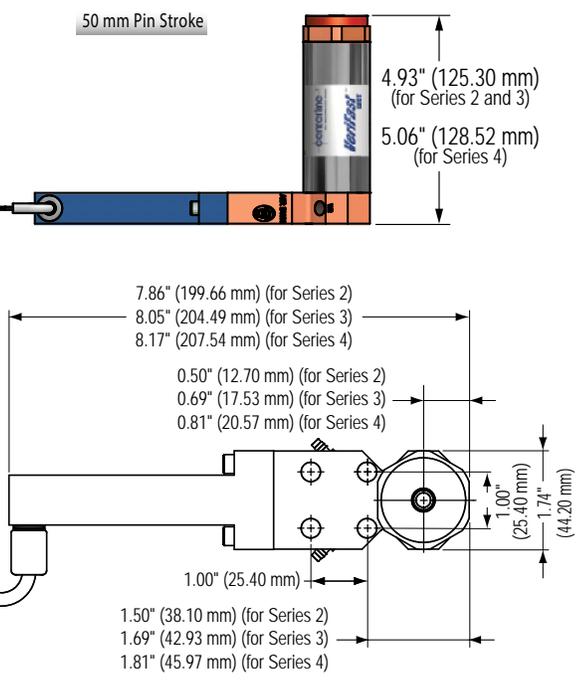
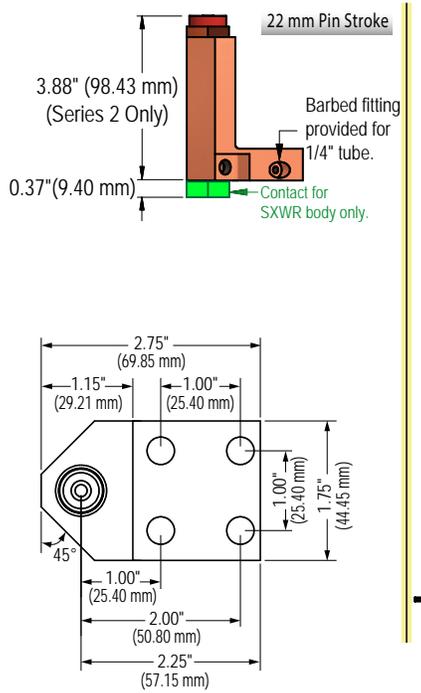
2. VeriFast™ LVDT Weld Body Information

2.1. Body Style:

- SXAR (Base Mount)
 SXKR (Base Mount)
 SXTR (Base Mount)
 SXQR (Base Mount)
 SXHR (Base Mount)
 SXJR (Base Mount)



- SXVR (Base Mount)
 SXWR (Base Mount)
 SXZR
 SYVR



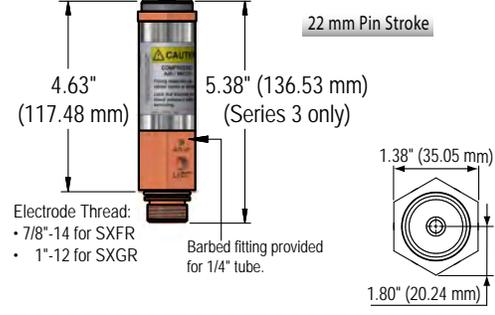
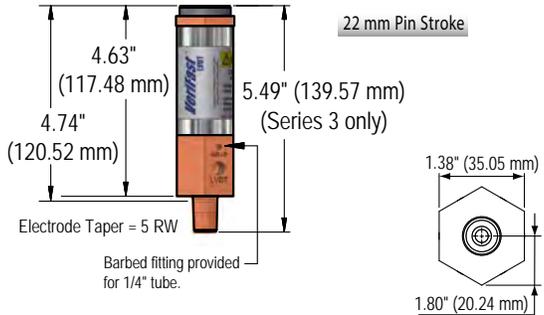
(Continued on next page)

Note: For VeriFast™ LVDT, a Signal Conditioner is required for each weld body, with the exception of interchangeable tooling.

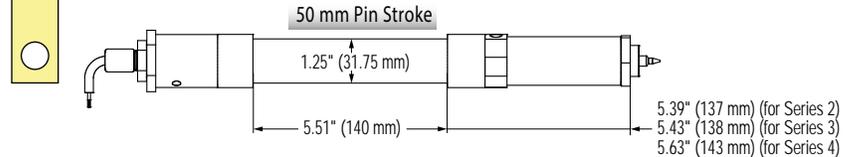
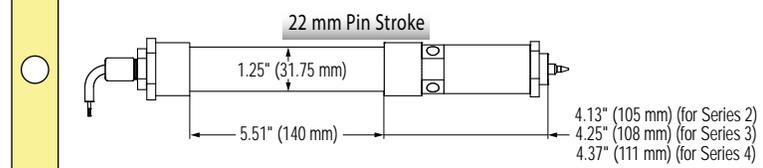
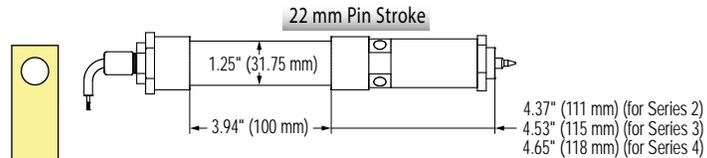
Weld Fastener Application with VeriFast™ LVDT

(Continued from previous page)

SXCR (Tapered)
 SXFR (Threaded, 7/8"-14)
 SXGR (Threaded, 1"-12)



Clamp Mount



2.2. Signal Conditioner:

(Note: A Signal Conditioner is required for each weld body, with the exception of interchangeable tooling.)

Is a Signal Conditioner required with this request?

Yes
 No

(Continued on next page)

Weld Fastener Application with VeriFast™ LVDT

(Continued from previous page)

2.3. Cable Exit Position:

For body style SXAR, SXHR, SXJR <input type="radio"/> Top Left <input type="radio"/> Top Right (Preferred)	For body style SXKR, SXTR, SXQR, SXVR, SXWR, SXZR, SYVR <input type="radio"/> Top Middle	For body style SXCR, SXFR, SXGR, Clamp Mount <input type="radio"/> Pre-Defined Position
---	---	--

TL (Top Left) TR (Preferred) (Top Right)

Bend Radius Min. 0.79" (20 mm)

TM (Top Middle) TM (Top Middle) TM (Top Middle) TM (Top Middle)

Bend Radius 0.79" (20 mm) Bend Radius 0.79" (20 mm)

SXKR SXTR, SXQR, SXVR, SXWR SXZR SYVR

(Note: Cable exits the unit to the left. The user can flip the blue holder for the cable to exit to the right).

2.4. Port Thread † :

 1/8" BSPP 1/8" NPT

† For Clamp Mount body, NPT port thread only (no BSPP).

2.5. Attachment Screws *,**:

 Metric (M6 x 1 x 35) Standard (1/4"-20 x 1 1/2") Not Needed

* Insulators are included for SXHR, SXJR, SXKR, SXQR, SXWR bodies when attachment screws are selected.
 ** SXCR, SXFR, SXGR, and Clamp Mount bodies do not use attachment screws.

3. Weld Head Information

Series *** <input type="radio"/> 2 (0.87" Weld Face Diameter) <input type="radio"/> 3 (1.25" Weld Face Diameter) <input type="radio"/> 4 (1.50" Weld Face Diameter)	Material <input type="radio"/> RWMA Class 3 <input type="radio"/> RWMA Class 11
--	---

*** Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are SXVR and SXWR weld bodies, which are Series 2 only. Tapered (SXCR) and Threaded (SXFR, SXGR) Weld Bodies are Series 3 only.
IMPORTANT: The Series number must be consistent between all components of VeriFast™ LVDT Electrode (Body, Pin, and Head).

4. VeriFast™ LVDT Weld Pin Information

Type of Pin

 with DG (36 mm) Connecting Rod. (For SXAR, SXKR, SXTR, SXQR, SXHR, SXJR, SXVR, SXWR weld bodies)
 with XZ (LVDT Cable / Pin Lock Assembly). (For SXZR weld body)
 with HG (76 mm) Connecting Rod. (For SYVR weld body)
 with DJ (39 mm) Connecting Rod. (For SXCR, SXFR, SXGR weld bodies)
 Tapped (E). (For Clamp Mount weld body)

Use Pin to Locate Stamping

 Yes
 No

Pin Clearance to Stamping

 0.005 in (0.13 mm)
 0.010 in (0.25 mm)
 Other (Specify)

Pin Material

 DuraPin™ (Recommended)
 Stainless
 Coated

5. Comments:

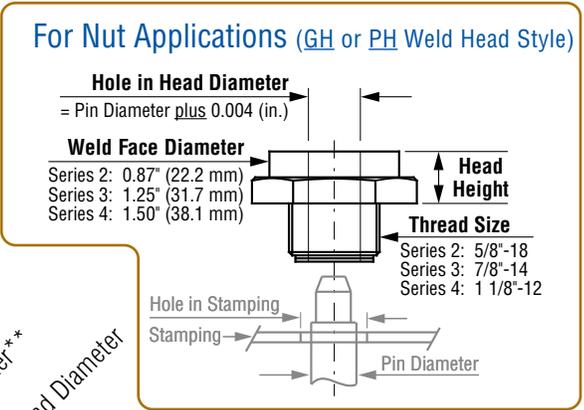
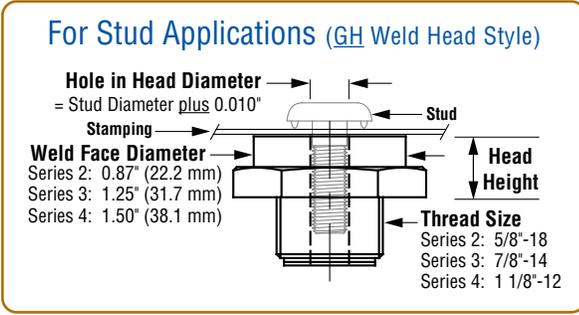
Please email completed form to: customerservice@cntrline.com

Weld Heads - GH and PH Styles



GH Style
• For nut or stud welding

PH Style
• For nut welding; not recommended for stud welding
• Lower cost
• Quick delivery



Weld Head Prefix Series* Head Height** Material Weld Face Diameter** Hole in Head Diameter

GH | 3 | 050 | T | 125 | 352

Weld Head Prefix
For nut or stud applications = GH
For nut applications only = PH
(not recommended for stud applications)

Series (must be consistent with 'Weld Face Diameter' below and 'Hole in Head Diameter' on the right)
Series 2 = 2
Series 3* = 3
Series 4 = 4

Head Height**
Series 2 and 3 = 050
Series 4 = 062

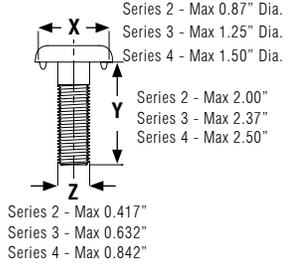
Material
RWMA Class 3 Copper = C
RWMA Class 11 Tungsten = T

Weld Face Diameter**
0.87" Weld Face (for Series 2) = 087
1.25" Weld Face (for Series 3*) = 125
1.50" Weld Face (for series 4) = 150

Hole in Head Diameter

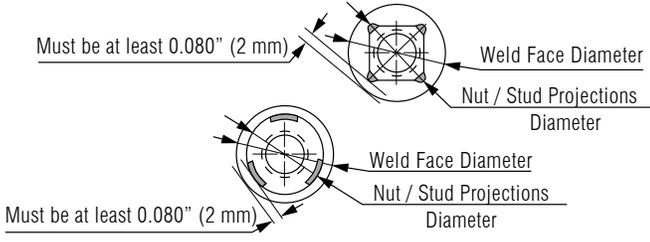
Series	For GH Heads	For PH Heads
Series 2:	Max. 0.427" (10.85 mm)	Max. 0.377" (9.57 mm)
Series 3:	Max. 0.642" (16.31 mm)	Max. 0.638" (16.20 mm)
Series 4:	Max. 0.852" (21.64 mm)	Max. 0.825" (20.95 mm)

- **Important for Nut applications only (using GH or PH heads):**
We recommend the Hole in Head Diameter be 0.004" larger than the Pin Diameter.
Example: If Pin Diameter = 0.348", the Hole in Head Diameter will become: 0.348" + 0.004" = 0.352". The value in this field will be 352. (Ensure that this value does not exceed the value for the desired Series and Weld Head Style in the table above).
- **Important for Stud applications only (using GH head only):**
We recommend the Hole in Head Diameter be 0.010" larger than the Stud Diameter (Z).
Example: If Stud Diameter Z = 0.430", the Hole in Head Diameter will become: 0.430" + 0.010" = 0.440". The value in this field will be 440. (Ensure that this value does not exceed the value for the desired Series and Weld Head Style in the table above).



Note: X, Y and Z dimensions of the Stud must coordinate with the chosen Weld Head Series.

Important: The Weld Face Diameter must be at least 0.160" (4mm) larger than the Nut / Stud Projections Diameter (or 0.080" (2mm) radius difference). If it is not, the next larger weld head series should be used for the application.



* Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are SXVR and SXWR weld bodies, which are Series 2 only. Threaded (SXGR) and Tapered (SXCR) bodies are Series 3 only. The Series number must be consistent between all components (Body, Pin, and Head).

** Special sizes are available for larger dimension requirements or areas with clearance restrictions. Contact CenterLine for information.

Nut Weld Pins Overview

Pin Finish/Material

Pin Type	Description	Material Type or Coating*	Retract
G	Supported by spring and/or air.	Stainless steel - Typically used for trials. Quick delivery.	 Non-retract Pin without O-Ring
C	Supported by spring and/or air.	HSE Coated - Multi-layer hard coating. Provides some insulation and good pin life.	
J	Supported by spring and/or air.	DuraPin™ Coated Tool Steel -Multi-layer, long-lasting weld pin. Designed for long life and abrasive materials like hot stamp.	
R	Movement controlled by Air Pressure only.	Stainless steel - Typically used for trials. Quick delivery.	 Retract Pin includes O-Ring
K	Movement controlled by Air Pressure only.	HSE Coated - Multi-layer hard coating. Provides some insulation and good pin life.	
S	Movement controlled by Air Pressure only.	DuraPin™ Coated Tool Steel -Multi-layer, long-lasting weld pin. Designed for long life and abrasive materials like hot stamp.	

* Ceramic - Available upon request, contact CenterLine.

Recommended Pin Nose Types

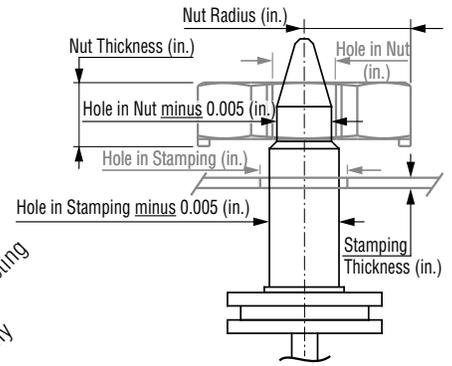
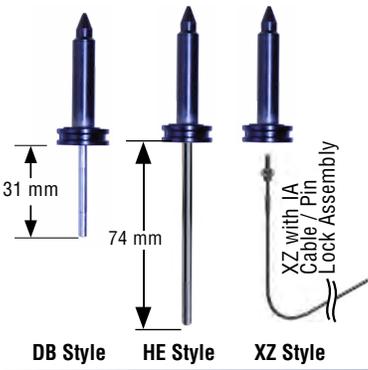
		
Nose N	Nose W	Nose Z
Recommended for manual part load, auto/manual nut load.	Recommended for robot part load, auto/manual nut load.	Recommended for piloted nuts, pin disengages, manual nut load.
Note: Autoload Nose types can also be used in manual applications. Use "A" in part number to avoid duplication.		

Alternate Pin Nose Types

Manual Nut Load					Auto/Manual Nut Load				
									
Nose A	Nose B	Nose C	Nose D	Nose E	Nose H	Nose K	Nose L	Nose M	Nose P

VeriFast™ IA Nut Weld Pin

- **DB Style** - For use with **22mm Stroke Base Mount** and **Tapered / Threaded Weld Bodies**
- **HE Style** - For use with **50mm Stroke SYVR** Weld Bodies and **69mm Stroke SZVR** Weld Bodies
- **XZ Style** - For use with **50mm Stroke SXZR** Weld Bodies



Pin Finish / Material
 Pin Sensing System
 Series*
 Nose Type
 Hole in Stamping minus 0.005 (in.)
 Hole in Nut minus 0.005 (in.)
 Stamping Thickness (in.)
 Nut Thickness (in.)
 Nut Radius (in.)
 Style of Pin and Connecting Rod Assembly or Cable Assembly

S B 3 N 348 270 25 25 DB

Pin Finish / Material

- Stainless = R
- Coated = K
- DuraPin™ = S

Pin Sensing System

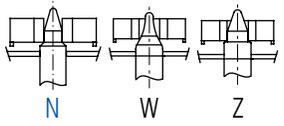
- VeriFast™ IA = B
- VeriFast™ IA SXZR Pin Only = V

***Series**

- Series 2 = 2
- Series 3* = 3
- Series 4 = 4

Nose Type

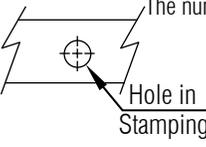
Recommended: N, W, and Z
 (See page 38 for more options)



Hole in Stamping minus 0.005
 (3 decimals, measured in inches)

Example: If Hole in Stamping is 0.353":
 $0.353" - 0.005" = 0.348"$

The number in this field will be: 348



Hole in Nut minus 0.005
 (3 decimals, measured in inches)

Example: If Hole in Nut is 0.275":
 $0.275" - 0.005" = 0.270"$

The number in this field will be: 270



Style of Pin and Connecting Rod Assembly or Cable Assembly

- DB = 31 mm. Base Mount Weld Bodies: SXAR, SXKR, SXTR, SXQR, SXHR, SXJR, SXVR, SXWR (See page 10) and Tapered / Threaded Weld Bodies (See page 13)
- HE = 74 mm. SYVR and SZVR Weld Body (See page 14)
- XZ = SXZR Cable Assembly. SXZR Weld Body = For replacement **Pin only** (no IA XZ Cable / Pin Lock Assembly), this field remains empty.

Nut Thickness (2 decimals, measured in inches)

Measured when Nut Feeding is done **Manually**

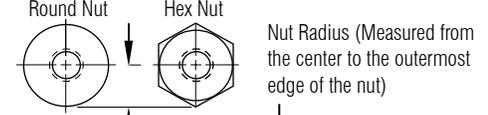


Example: If Nut Thickness is 0.25", the number in this field will be 25.



Nut Radius (2 decimals, measured in inches)

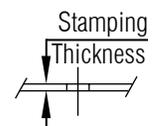
Measured when Nut Feeding is done **Automatically**



Example: If Nut Radius is 0.47", the number in this field will be 47.



Stamping Thickness (2 decimals, measured in inches)

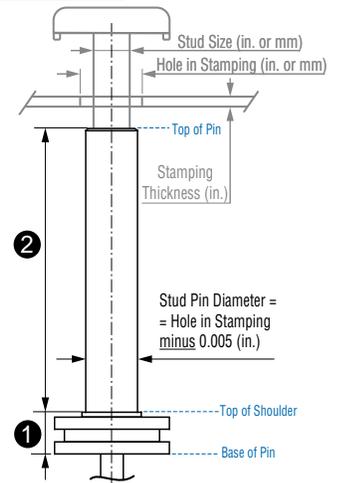
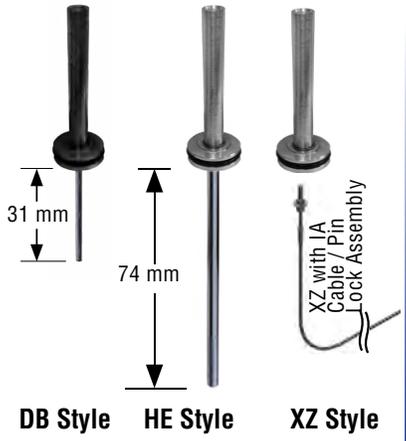


- If Stamping Thickness is:
- less than 0.25", the number in this field will be 25.
 - greater than 0.25", contact CenterLine

* The series number must be consistent between all components (Body, Pin, and Head).

VeriFast™ IA Stud Weld Pin

- **DB Style** - For use with **22mm Stroke Base Mount** and **Tapered / Threaded Weld Bodies**
- **HE Style** - For use with **50mm Stroke SYVR** Weld Bodies and **69mm Stroke SZVR** Weld Bodies
- **XZ Style** - For use with **50mm Stroke SXZR** Weld Bodies



Pin Finish / Material
 Pin Sensing System
 Stud Feeding Mode
 Series*
 Stud Size (in. or mm)
 Length from Top of Shoulder to Top of Pin (in. or mm)
 Length from Base of Pin to Top of Shoulder (in. or mm)
 Style of Pin and Connecting Rod Assembly or Cable Assembly

S
B
P
3
M08
047
07
DB

Pin Finish / Material
 Stainless = R
 Coated = K
 DuraPin™ = S

Pin Sensing System
 VeriFast™ IA = B

Stud Feeding Mode
 Manual = P
 Automatic = A

***Series**
 Series 2 = 2
 Series 3* = 3
 Series 4 = 4

Stud Size
 Measured in inches, 3 decimals.
 Becomes 3 digits.

Example: If diameter of Stud is 0.315", the number in this field will be **315**
 or

Measured in millimeters, 0 decimals.
 Becomes prefix "M" followed by 2 digits.
Example: If diameter of Stud is 8 mm, the number in this field will be **M08**

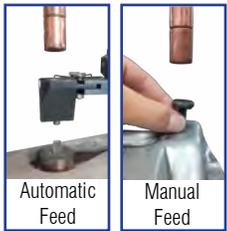
Style of Pin and Connecting Rod Assembly or Cable Assembly
 DB = 31 mm. Base Mount Weld Bodies (SXAR, SXKR, SXTR, SXQR, SXHR, SXJR, SXVR, SXWR) and Tapered / Threaded Weld Bodies
 HE = 74 mm. SYVR and SZVR Weld Bodies
 XZ = SXZR Cable Assembly. SXZR Weld Body

Length from Base of Pin to Top of Shoulder
 (See ① in drawing above)
 Measured in inches, 2 decimals. Becomes 2 digits.
Example: If length is 0.27", the number in this field will be **27**
 or

Measured in millimeters, 0 decimals. Becomes 2 digits.
Example: If length is 7 mm, the number in this field will be **07**

Length from Top of Shoulder to Top of Pin
 (See ② in drawing above)
 Measured in inches, 2 decimals. Becomes 3 digits.
Example: If length is 1.85", the number in this field will be **185**
 or

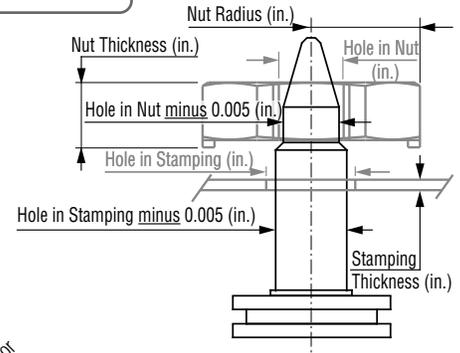
Measured in millimeters, 0 decimals. Becomes 2 digits.
Example: If length is 47 mm, the number in this field will be **047**



* Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are SXVR and SXWR weld bodies, which are Series 2 only. The Series number must be consistent between all components (Body, Pin, and Head)

VeriFast™ LVDT Nut Weld Pin

- **DG Style** - For use with **22mm Stroke Base Mount Weld Bodies**
- **DJ Style** - For use with **22mm Stroke Tapered / Threaded Weld Bodies**
- **HG Style** - For use with **50mm Stroke SYVR Weld Bodies**
- **XZ Style** - For use with **50mm Stroke SXZR Weld Bodies**



Pin Finish / Material
 Pin Sensing System
 Series*
 Nose Type
 Hole in Stamping minus 0.005 (in.)
 Hole in Nut minus 0.005 (in.)
 Stamping Thickness (in.)
 Nut Thickness (in.)
 Nut Radius (in.)
 Style of Pin and Connecting Rod Assembly or Cable / Pin Lock Assembly

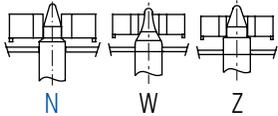
S V 3 N 348 270 25 25 DG

Pin Finish / Material
 Stainless = R
 Coated = K
 DuraPin™ = S

Pin Sensing System
 VeriFast™ LVDT = V

***Series**
 Series 2 = 2
 Series 3* = 3
 Series 4 = 4

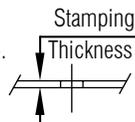
Nose Type
 Recommended: N, W, and Z
 (See page 38 for more options)



Hole in Stamping minus 0.005
 (3 decimals, measured in inches)
 Example: If Hole in Stamping is 0.353":
 $0.353 - 0.005 = 0.348$
 The number in this field will be: 348

Hole in Nut minus 0.005
 (3 decimals, measured in inches)
 Example: If Hole in Nut is 0.275":
 $0.275 - 0.005 = 0.270$
 The number in this field will be: 270

Stamping Thickness
 (2 decimals, measured in inches)
 If Stamping Thickness is:
 • less than 0.25", the number in this field will be 25.
 • greater than 0.25", contact CenterLine.



Style of Pin and Connecting Rod Assembly or Cable / Pin Lock Assembly

DG = 36 mm. Base Mount Weld Bodies: SXAR, SXKR, SXTR, SXQR, SXHR, SXJR, SXVR, SXWR (See page 26)
 DJ = 39 mm. Tapered (SXCR) and Threaded (SXFR, SXGR) Weld Bodies (See page 29)
 HG = 76 mm. SYVR Weld Body (See page 30)
 XZ = SXZR Weld Body (See page 31)

If ordering **Consumable Nut Weld Pin** only (no LVDT Connecting Rod Assembly or Cable / Pin Lock Assembly), this field remains empty.

Nut Thickness (2 decimals, measured in inches)
 Measured when Nut Feeding is done **Manually**



Example: If Nut Thickness is 0.25", the number in this field will be 25.



Nut Radius (2 decimals, measured in inches)
 Measured when Nut Feeding is done **Automatically**



Example: If Nut Radius is 0.47", the number in this field will be 47.



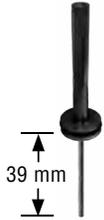
* Series 3 is preferred for all applications, unless clearance or welding issues exist. Exceptions are SXVR and SXWR weld bodies, which are Series 2 only. The Series number must be consistent between all components (Body, Pin, and Head).

VeriFast™ LVDT Stud Weld Pin

- **DG Style** - For use with **22mm Stroke Base Mount** Weld Bodies
- **DJ Style** - For use with **22mm Stroke Tapered / Threaded** Weld Bodies
- **HG Style** - For use with **50mm Stroke SYVR** Weld Bodies
- **XZ Style** - For use with **50mm Stroke SXZR** Weld Bodies



DG Style
For LVDT Base Mount Weld Bodies



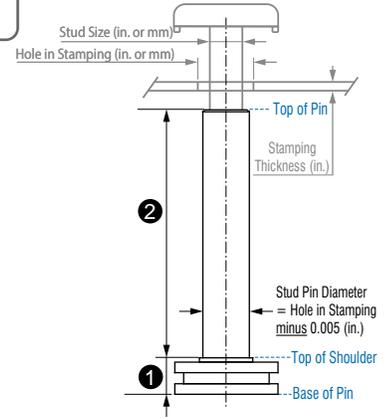
DJ Style
For LVDT Tapered / Threaded Weld Bodies



HG Style
For LVDT SYVR Weld Bodies



XZ Style
For LVDT SXZR Weld Bodies



Pin Finish / Material
Pin Sensing System
Stud Feeding Mode
Series*
Stud Size (in. or mm)
Length from Top of Shoulder to Top of Pin (in. or mm)
Length from Base of Pin to Top of Shoulder (in. or mm)
Style of LVDT Cable / Pin Lock Assembly or Pin and Connecting Rod Assembly

S V P 3 M08 047 07 HG

Pin Finish / Material
Stainless = R
Coated = K
DuraPin™ = S

Pin Sensing System
VeriFast™ LVDT = V

Stud Feeding Mode
Manual = P
Automatic = A

***Series**
Series 2 = 2
Series 3* = 3
Series 4 = 4

Stud Size
Measured in inches, 3 decimals.
Becomes 3 digits.

Example: If diameter of Stud is 0.315", the number in this field will be 315

OR

Measured in millimeters, 0 decimals.
Becomes prefix "M" followed by 2 digits.

Example: If diameter of Stud is 8 mm, the number in this field will be M08

Style of Pin and Connecting Rod Assembly or Cable / Pin Lock Assembly

DG = 36 mm. Base Mount Weld Bodies: SXAR, SXKR, SXTR, SXQR, SXHR, SXJR, SXVR, SXWR (See page 26)

DJ = 39 mm. Tapered (SXCR) and Threaded (SXFR, SXGR) Weld Bodies (See page 29)

HG = 76 mm. SYVR Weld Body (See page 30)

XZ = SXZR Weld Body (See page 31)

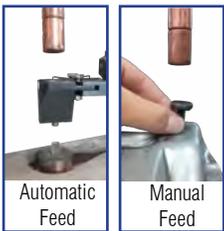
If ordering **Consumable Nut Weld Pin** only (no LVDT Connecting Rod Assembly or Cable / Pin Lock Assembly), this field remains empty.

Length from Base of Pin to Top of Shoulder

(See ① in drawing above)
Measured in inches, 2 decimals. Becomes 2 digits.
Example: If length is 0.27", the number in this field will be 27
OR
Measured in millimeters, 0 decimals. Becomes 2 digits.
Example: If length is 7 mm, the number in this field will be 07

Length from Top of Shoulder to Top of Pin

(See ② in drawing above)
Measured in inches, 2 decimals. Becomes 3 digits.
Example: If length is 1.85", the number in this field will be 185
OR
Measured in millimeters, 0 decimals. Becomes 2 digits.
Example: If length is 47 mm, the number in this field will be 047



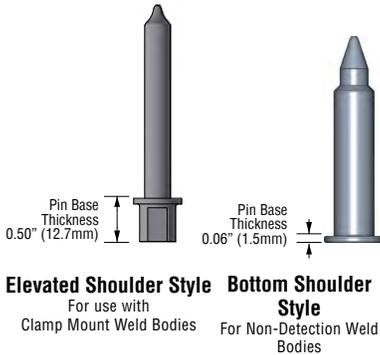
Automatic Feed

Manual Feed

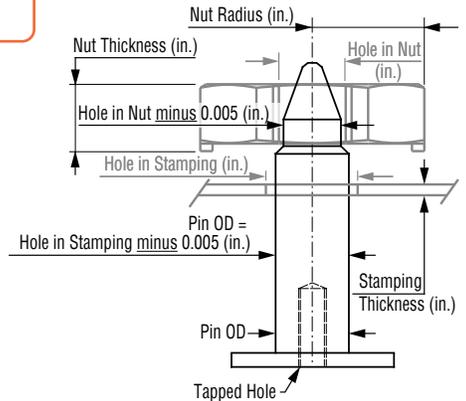
* Series 3 is preferred for all applications, unless clearance or welding issues exist. The Series number must be consistent between all components (Body, Pin, and Head).

Tapped Nut Weld Pin

- For use with 22 mm and 50 mm Stroke Weld Bodies:
- VeriFast™ IA and LVDT Clamp Mount Weld Bodies
 - Other Non-Detection Weld Bodies



Tapped Nut Weld Pin
 Pin Finish / Material
 Nut Feeding Mode
 Series*
 Nose Type
 Hole in Stamping minus 0.005 (in.)
 Hole in Nut minus 0.005 (in.)
 Stamping Thickness (in.)
 Nut Thickness (in.) or
 Nut Radius (in.) or
 Tapped Hole**



T J A 3 N 348 270 25 25 E

Tapped

Pin Finish / Material

- Stainless = G
- Coated = C
- DuraPin™ = J

Nut Feeding Mode

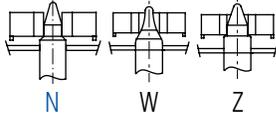
- Auto Load (for Bottom Shoulder Style) = A
- Manual Load (for Bottom Shoulder Style) = P
- Auto Load (for Elevated Shoulder Style) = Q
- Manual Load (for Elevated Shoulder Style) = R

*Series

- Series 2 = 2
- Series 3* = 3
- Series 4 = 4

Nose Type

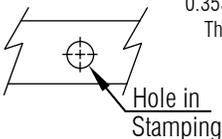
Recommended: N, W, and Z
 (See page 38 for more options)



Hole in Stamping minus 0.005

(3 decimals, measured in inches)

Example: If Hole in Stamping is 0.353":
 $0.353 - 0.005 = 0.348$
 The number in this field will be: 348



Hole in Nut minus 0.005

(3 decimals, measured in inches)

Example: If Hole in Nut is 0.275":
 $0.275 - 0.005 = 0.270$
 The number in this field will be: 270



Tapped Hole**

(Tap Size)

- A = 8-32 Min. Pin OD = 0.210"
- B = 10-32 Min. Pin OD = 0.240"
- C = 1/4-20 Min. Pin OD = 0.310"
- D = 1/4-28 Min. Pin OD = 0.310"
- E = M4 x 0.7 Min. Pin OD = 0.210" (For VeriFast™ LVDT Clamp Mount Weld Bodies)
- F = M5 x 0.8 Min. Pin OD = 0.240"
- G = M6 x 1.0 Min. Pin OD = 0.310" (For VeriFast™ IA Clamp Mount Weld Bodies)

Nut Thickness (2 decimals, measured in inches)

Measured when Nut Feeding is done **Manually**



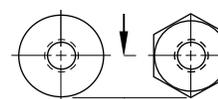
Example: If Nut Thickness is 0.25", the number in this field will be 25.



Nut Radius (2 decimals, measured in inches)

Measured when Nut Feeding is done **Automatically**

Round Nut Hex Nut

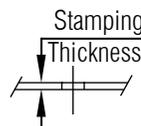


Nut Radius (Measured from the center to the outermost edge of the nut)

Example: If Nut Radius is 0.47", the number in this field will be 47.



Stamping Thickness (2 decimals, measured in inches)



If Stamping Thickness is:

- less than 0.25", the number in this field will be 25.
- greater than 0.25", contact CenterLine

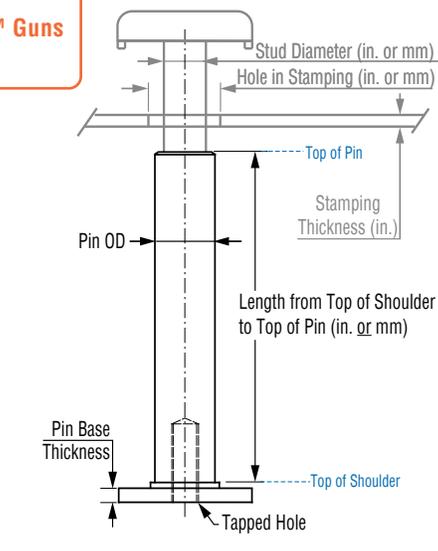
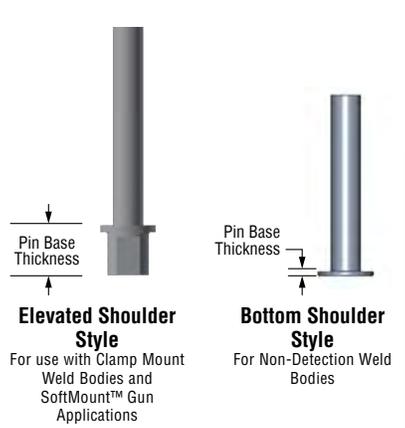
* Series 3 is preferred for all applications, unless clearance or welding issues exist. The Series number must be consistent between all components (Body, Pin, and Head).

** Only Tapped Weld Pins can be used with Clamp Mount Weld Bodies.

Tapped Stud Weld Pin

For use with 22 mm and 50 mm Stroke Weld Bodies:

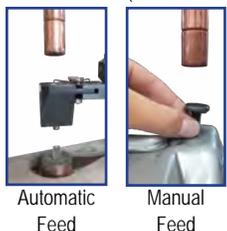
- VeriFast™ IA and LVDT Clamp Mount Weld Bodies, and SoftMount™ Guns
- Other Non-Detection Weld Bodies



Tapped Stud Weld Pin
 Pin Finish / Material
 Pin Style
 Stud Feeding Mode
 Series *
 Stud Diameter
 Length from Top of Shoulder to Top of Pin (in. or mm)
 Pin Base Thickness
 Tapped Hole **

T
J
S
A
3
M08
013
015
E

- Tapped**
- Pin Finish / Material**
 Stainless = G
 Coated = C
 DuraPin™ = J
- Pin Style**
 Stud = S
- Stud Feeding Mode**
 Auto Load (for Bottom Shoulder Style) = A
 Manual Load (for Bottom Shoulder Style) = P
 Auto Load (for Elevated Shoulder Style) = Q
 Manual Load (for Elevated Shoulder Style) = R



- *Series**
 Series 2 = 2
 Series 3 = 3
 Series 4 = 4

Stud Diameter
 Measured in inches, 3 decimals.
 Becomes 3 digits.
 Example: If diameter of Stud is 0.315",
 the number in this field will be: 315

or

Measured in millimeters, 0 decimals.
 Becomes Prefix "M" followed by 2
 digits.
 Example: If diameter of stud is 8 mm,
 the number in this field will be: M08

- Tapped Hole****
 (Tap Size)
- | | |
|--------------|--|
| A = 8-32 | Min. Pin OD = 0.210" |
| B = 10-32 | Min. Pin OD = 0.240" |
| C = 1/4-20 | Min. Pin OD = 0.310" |
| D = 1/4-28 | Min. Pin OD = 0.310" |
| E = M4 x 0.7 | Min. Pin OD = 0.210" (For VeriFast™ LVDT Clamp Mount Weld Bodies & SoftMount™ Guns with an LVDT Body) |
| F = M5 x 0.8 | Min. Pin OD = 0.240" (For VeriFast™ IA Clamp Mount Weld Bodies mounted on SoftMount™ Guns) |
| G = M6 x 1.0 | Min. Pin OD = 0.310" (For VeriFast™ IA Clamp Mount Weld Bodies, <u>not</u> mounted on SoftMount™ Guns) |

Pin Base Thickness
 (Elevated Shoulder Style - minimum 0.50" (12.7 mm))
 (Bottom Shoulder Style - minimum 0.06" (1.5 mm))
 Measured in inches, 2 decimals. Becomes 3 digits.
 Example: If pin base thickness is 0.06", the number in this field will be: 006

or

Measured in millimeters, 1 decimal. Becomes 3 digits.
 Example: If pin base thickness is 1.5 mm, the number in this field will be: 015

Length from Top of Shoulder to Top of Pin
 (minimum 0.50" (13mm))
 Measured in inches, 2 decimals. Becomes 3 digits.
 Example: If engagement length is 1.50", the number in this field will be: 150

or

Measured in millimeters, 0 decimal. Becomes 3 digits.
 Example: If engagement length is 13 mm, the number in this field will be: 013

* Series 3 is preferred for all applications, unless clearance or welding issues exist. The Series number must be consistent between all components (Body, Pin, and Head).

** Only **Tapped Weld Pins** can be used with **Clamp Mount Weld Bodies**.

Generic Nut Weld Pins

For use with Non-Detection Weld Bodies
 Not to be used with VeriFast™ IA and LVDT Bodies



Tapped Pin (Optional)
 Pin Finish/Material
 Pin Type
 Series
 Nose Type
 Hole in Stamping minus 0.005 (in.)
 Hole in Nut minus 0.005 (in.)
 Stamping Thickness (in.)
 Nut Thickness or Nut Radius (in.)
 Tap Size

T G P 3 N 547 417 25 45 E

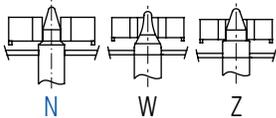
Add Prefix T for Tapped Pin

Pin Finish/Material
 G, C, J, R, K or S

Nut Feeding Mode
 Manual = P
 Automatic = A

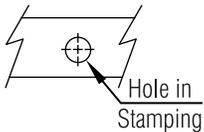
Series
 Series 2 = 2
 Series 3 = 3
 Series 4 = 4

Nose Type
 Recommended: N, W, and Z
 (See page 38 for more options)



Hole in Stamping minus 0.005
 (3 decimals, measured in inches)

Example: If Hole in Stamping is 0.552":
 $0.552" - 0.005" = 0.547"$



The number in this field will be: 547

Tap Size (only for Tapped Pins)

Tap Size	Min. pin OD
A = 8-32	0.210"
B = 10-32	0.240"
C = 1/4-20	0.310"
D = 1/4-28	0.310"
E = M4 x 0.7	0.210"
F = M5 x 0.8	0.240"
G = M6 x 1.0	0.310"

If ordering **Pin without Tap**, this field remains empty.

Nut Thickness (2 decimals, measured in inches)

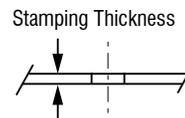
Example: If Nut Thickness is 0.45", the number in this field will be 45.



Stamping Thickness (2 decimals, measured in inches)

Example: If Stamping Thickness is 0.25", the number in this field will be 25.

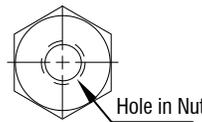
Note: If Stamping Thickness is greater than 0.25", contact CenterLine.



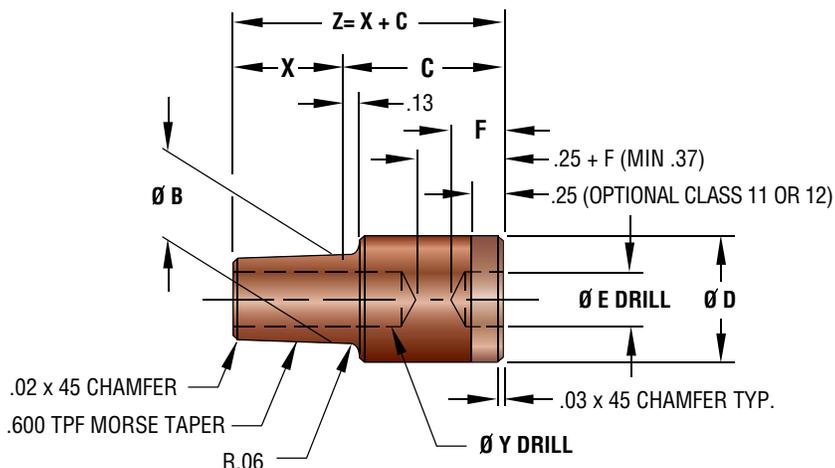
Hole in Nut minus 0.005
 (3 decimals, measured in inches)

Example: If Hole in Nut is 0.422":
 $0.422" - 0.005" = 0.417"$

The number in this field is 417

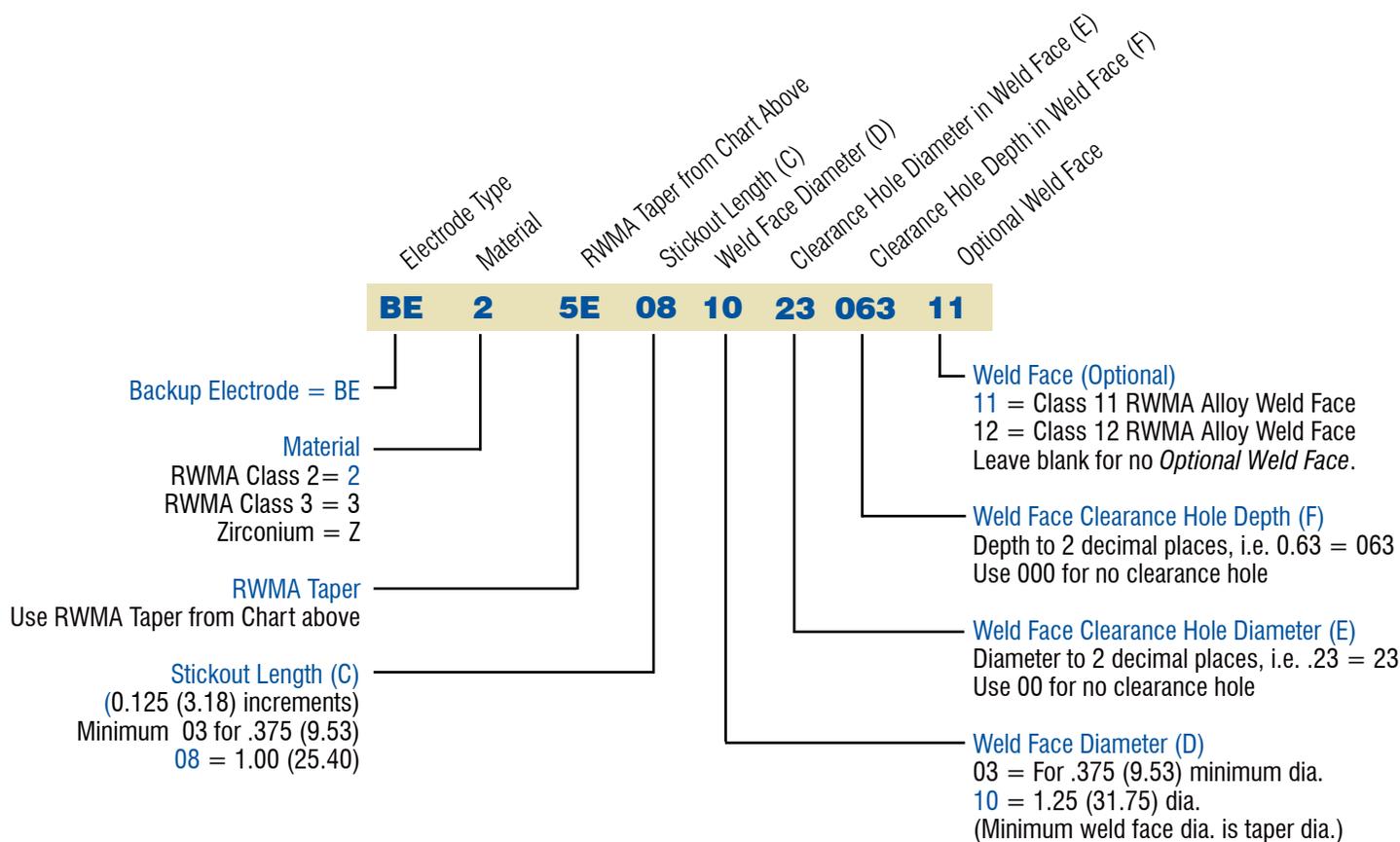


Backup Electrodes BE (RWMA Taper)

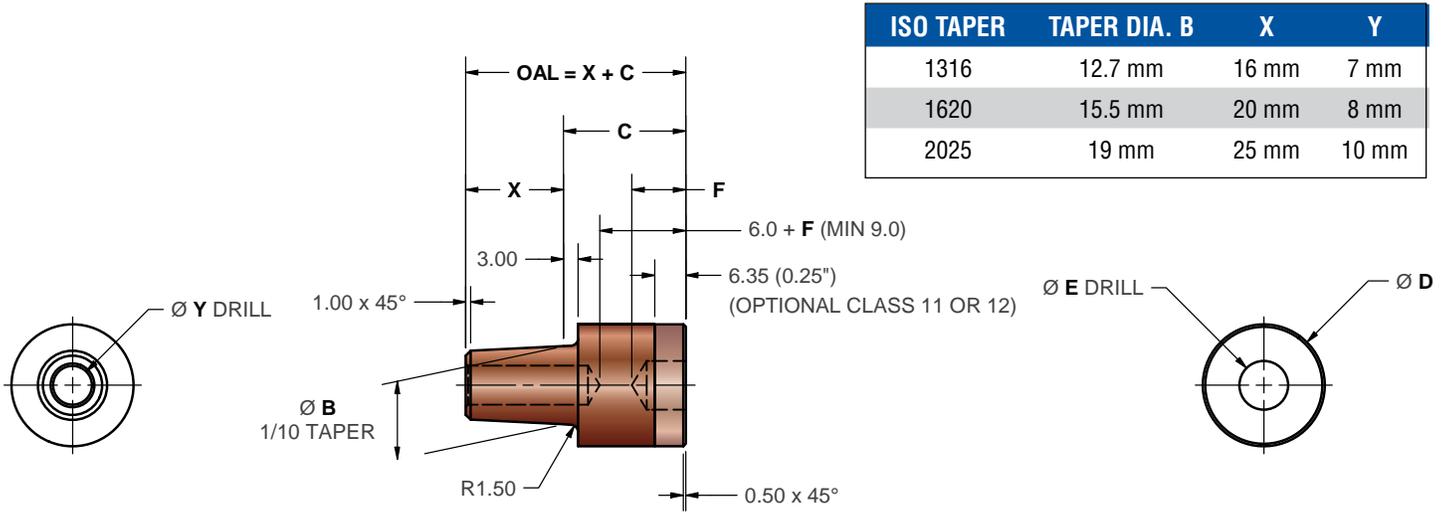


RWMA TAPER	B	X	Y
3E	.375 (9.52)	.500 (12.70)	9/32
4E	.463 (11.76)	.500 (12.70)	9/32
5E	.625 (15.88)	.750 (19.05)	3/8
6E	.750 (19.05)	.875 (22.23)	7/16
7E	.875 (22.23)	1.125 (28.57)	1/2
4C	.375 (9.52)	.285 (2.86)	9/32
5C	.415 (10.52)	.390 (9.52)	5/16
6C	.501 (12.70)	.500 (12.70)	3/8
7C	.613 (15.57)	.500 (12.70)	1/2

• Dimensions Shown Are: inches (mm).



Backup Electrodes BE (ISO Taper)

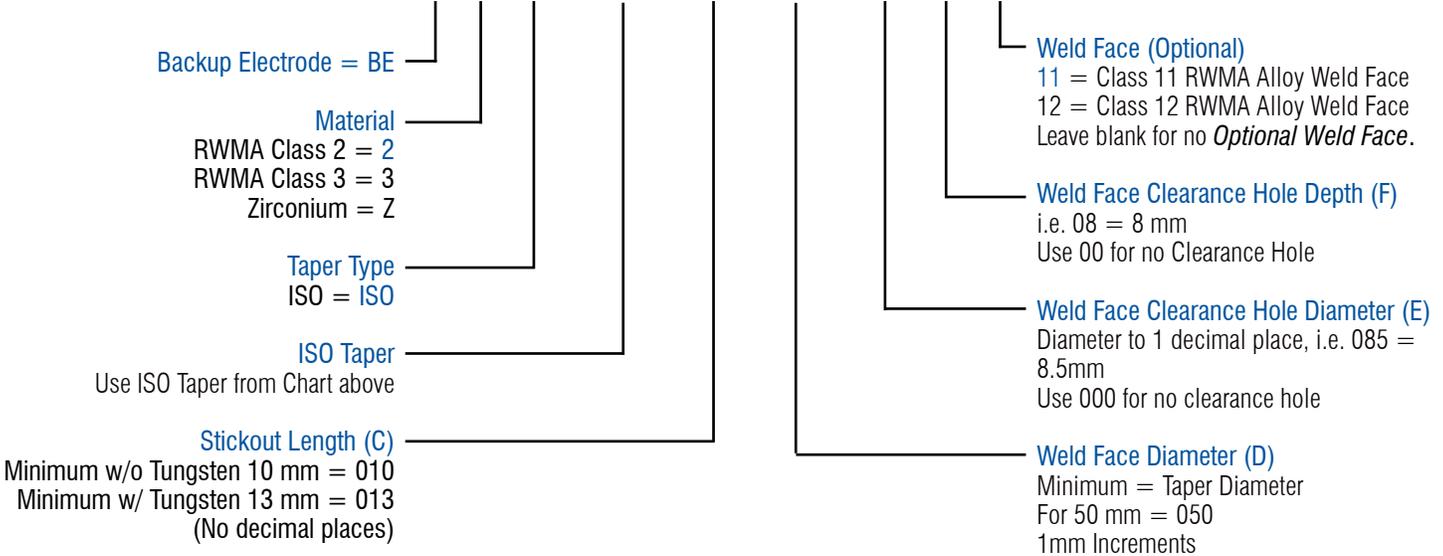


ISO TAPER	TAPER DIA. B	X	Y
1316	12.7 mm	16 mm	7 mm
1620	15.5 mm	20 mm	8 mm
2025	19 mm	25 mm	10 mm

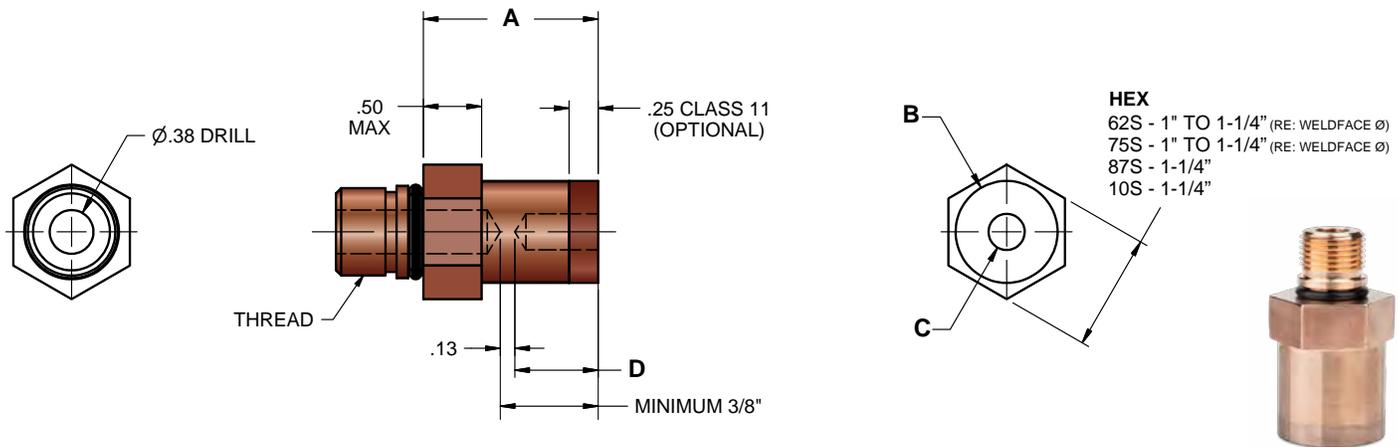
• Dimensions Shown Are: mm.

Electrode Type
Material
Taper Type
ISO Taper from Chart Above
Stickout Length (C)
Weld Face Diameter (D)
Clearance Hole Diameter (E)
Clearance Hole Depth in Weld Face (F)
Optional Weld Face

BE 2 ISO XXXX CCC DDD EEE FF 11



HE Hex Electrodes



HE 3 XXS AA BB CC DDD 11

Hex Electrode

RWMA Alloy Class
 Class 2 RWMA Material = 2
 Class 3 RWMA Material = 3

Thread
 For 5/8-18 thread = 62S
 For 3/4-16 thread = 75S
 For 7/8-14 thread = 87S
 For 1-12 thread = 10S

(A) Stickout Length
 (measured in 1/8" increments)
 Minimum Length = 04 (1/2")
 Maximum Length = 48 (6")

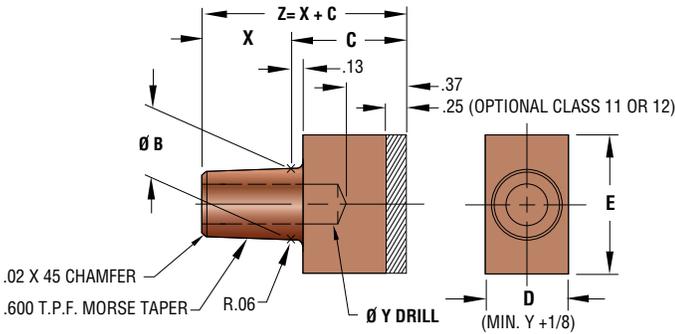
(B) Weld Face Diameter
 (measured in 1/8" increments)
 Minimum Diameter = 04 (1/2")
 Maximum Diameter = 10 (1-1/4")

Optional Weld Face
 11 = Class 11 RWMA Alloy Weld Face
 12 = Class 12 RWMA Alloy Weld Face
 Leave blank for no *Optional Weld Face*.

Clearance Hole Diameter (B) in Weld Face (C)
 (2 decimals, measured in inches. 3 characters)
Example: If the Clearance Hole Diameter is 0.62", the number in this field will be 062.
 Use 000 for no clearance hole.

Clearance Hole Depth in Weld Face (D)
 (2 decimals, measured in inches. 2 characters)
Example: If the Clearance Hole Depth is 0.62", the number in this field will be 062.
 Use 00 for no clearance hole.

RBE Block Electrodes



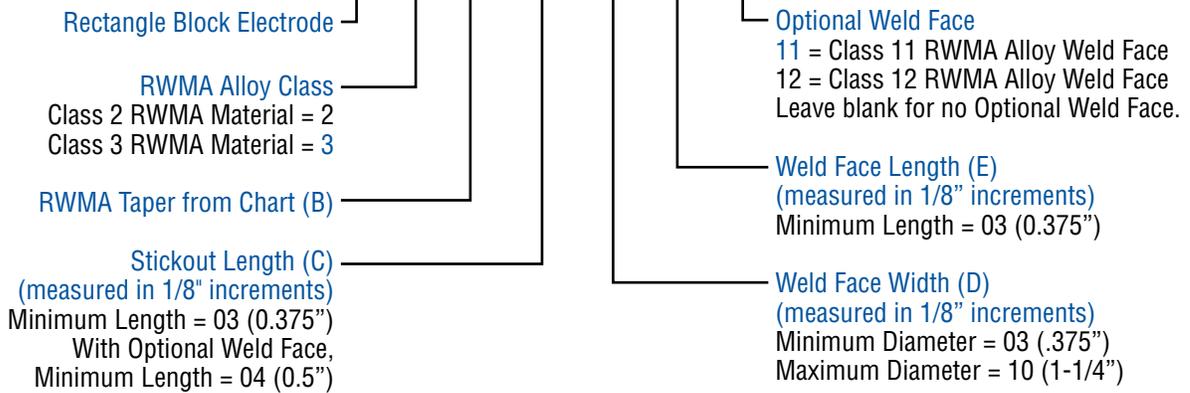
RWMA TAPER	B	X	Y
3E	.375 (9.52)	.500 (12.70)	9/32
4E	.463 (11.76)	.500 (12.70)	9/32
5E	.625 (15.88)	.750 (19.05)	3/8
6E	.750 (19.05)	.875 (22.23)	7/16
7E	.875 (22.23)	1.125 (28.57)	1/2
4C	.375 (9.52)	.285 (2.86)	9/32
5C	.415 (10.52)	.390 (9.52)	5/16
6C	.501 (12.70)	.500 (12.70)	3/8
7C	.613 (15.57)	.500 (12.70)	1/2



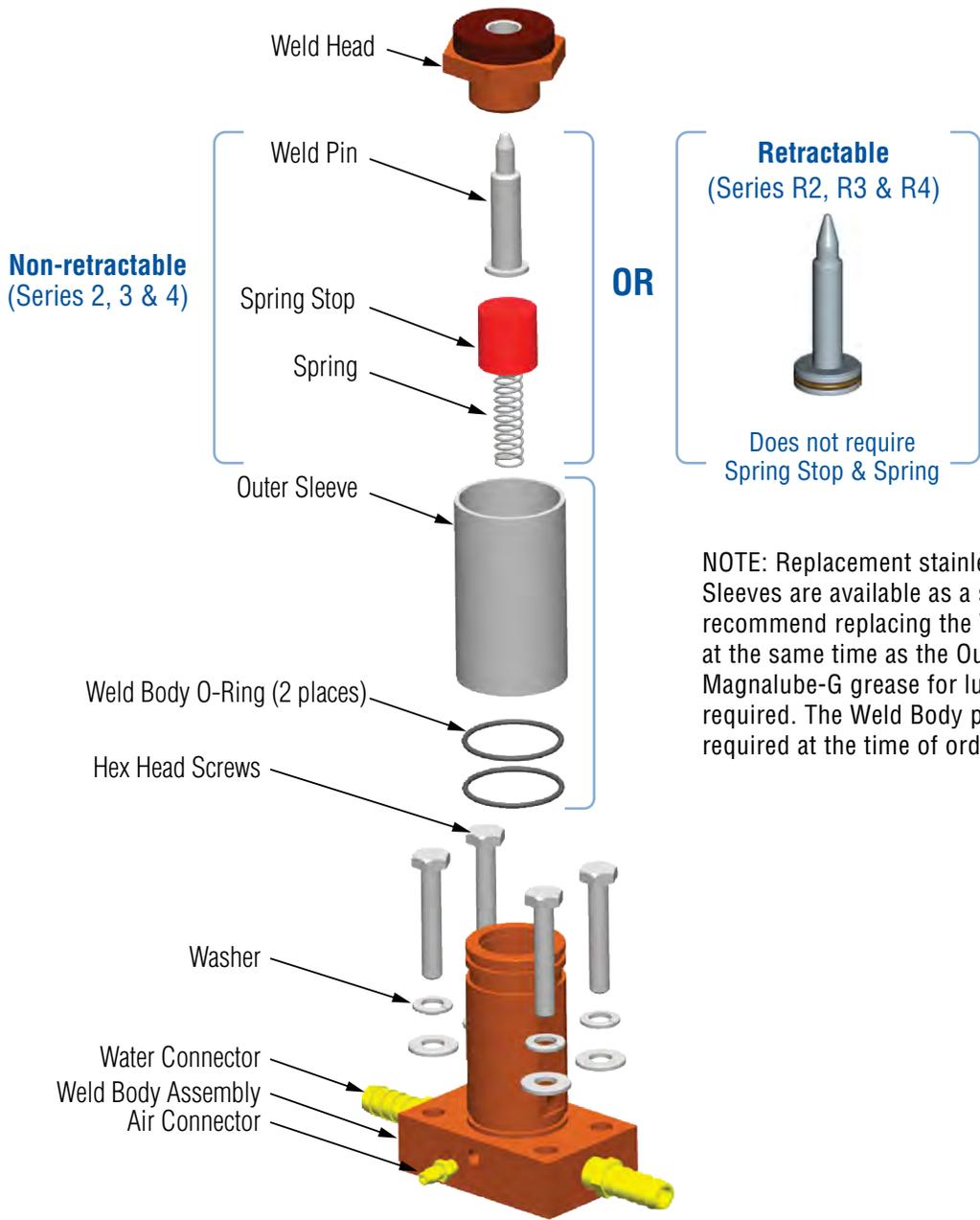
• Dimensions Shown Are: inches (mm).

Rectangle Backup Electrode
 RWMA Alloy Class
 RWMA Taper from Chart (B)
 Stickout Length (C)
 Weld Face Width (D)
 Weld Face Length (E)
 Optional Weld Face

RBE 2 5E 08 05 08 11



Non-Detection Weld Body Components



Service Parts (Not including Weld Head or Weld Pin)

Weld Pin O-Ring	Spring Stop	Spring	Weld Body O-Ring	Air Connector BF1	Contact CL-200-37
Series 2 - SLORD-013	U2 SPRINGSTOP-U2	U2 SPRING037013050	Series 2 Body - CL-206		
Series 3 - SLORD-017	X2 SPRINGSTOP-X2	U3 & U4 SPRING037025075	Series 3 Body - CL-306		
Series 4 - SLORD-020	U3 SPRINGSTOP-U3	X2 SPRING037032100	Series 4 Body - CL-406		
	X3 SPRINGSTOP-X3	X3 & X4 SPRING037034125			
	U4 SPRINGSTOP-U4			Water Connector RW-1015	
	X4 SPRINGSTOP-X4				

Non-Detection Weld Bodies



Base Mount Style Body

Non-Detection Body
Body Style
Series
Components

U C 3 NHP

Non-Detection Body
U for Standard Length
X for Extended Length .50 (12.70) Longer than Standard Length)

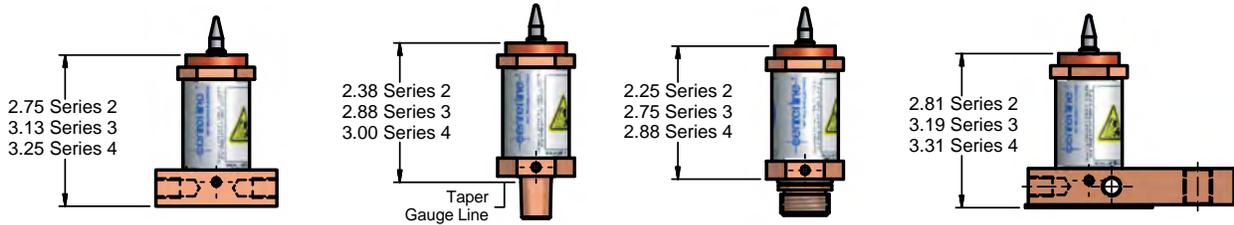
NHP (No Head or Pin) Note: Head and Pin must be ordered separately.
Use **Head Number** for complete Nut Welding unit
Use **Pin Number** for complete Nut Welding unit

Body Style
A = Base Mount
B = 4 RW Taper
C = 5 RW Taper
D = 6 RW Taper
E = 7 RW Taper
F = 7/8-14 Thread
G = 1-12 Thread

Series
2 = Series 2 (0.88 Weld Face)
3 = Series 3 (1.25 Weld Face)
4 = Series 4 (1.50 Weld Face)
R2 = Retractable Pin Series 2 (0.88 Weld Face)
R3 = Retractable Pin Series 3 (1.25 Weld Face)
R4 = Retractable Pin Series 4 (1.50 Weld Face)
Leave blank if ordering a complete Weld Body with Head and Pin, information is contained in the Head or Pin Number.

H=Base Mount with Cable Lug (17/32" clearance hole for 1/2 screw)
J=Base Mount with Cable Lug (Tapped hole for 1/2-13 screw)
K=Base Mount with Contact (CL-200-37)
L=Base Mount with Larger Air Port (1/8 NPT)
M=Modified Base Mount (Allows close mounting of multiple units)

Standard Length of Non-Detection Body Styles



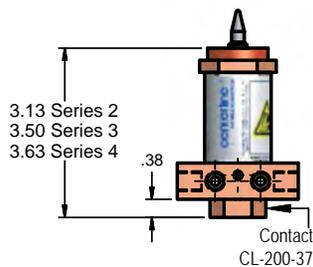
Body Style
A

Body Style
B* C D E

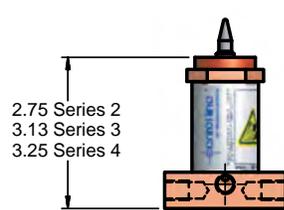
Body Style
F G

Body Style
H J

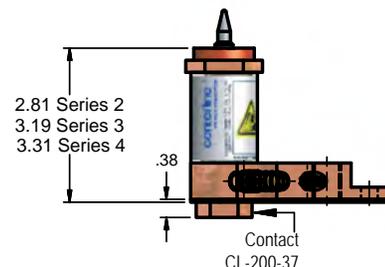
*Note: Body Style B add 0.25 to length shown.



Body Style
K



Body Style
L



Body Style
M

Non-Detection Weld Bodies

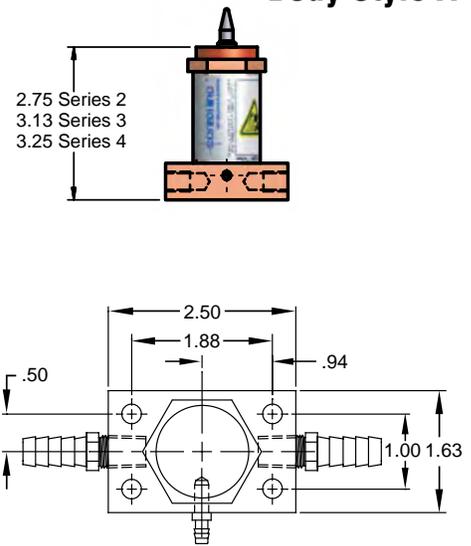


Non-Detection Body
Body Style
Series
Components

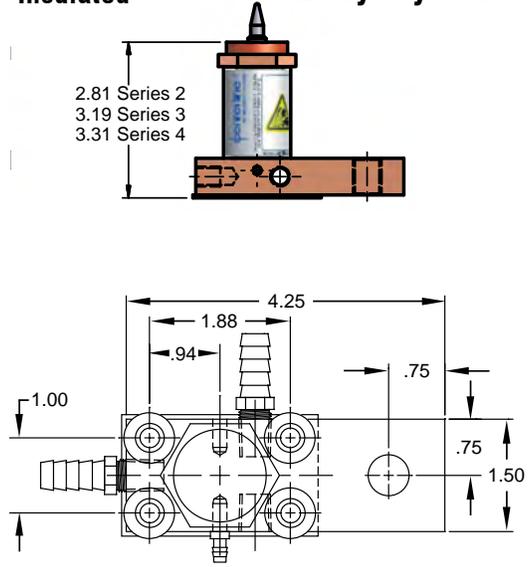
U 3 NHP

Base Mount Style Body

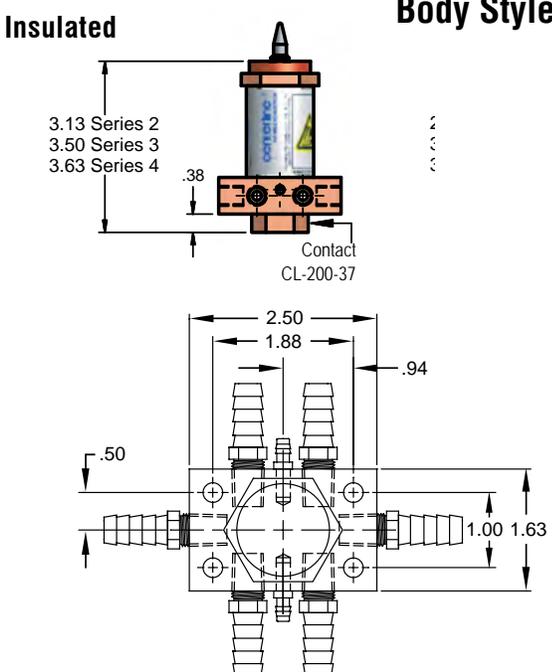
Body Style A



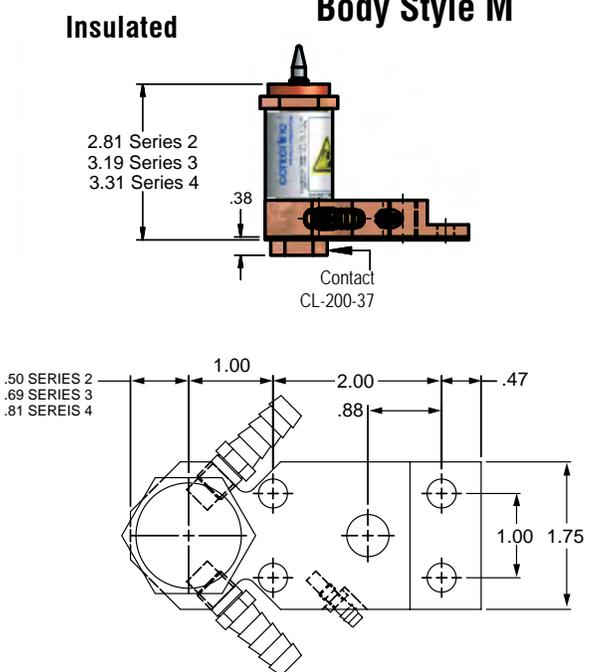
Insulated Body Style H&J



Body Style K



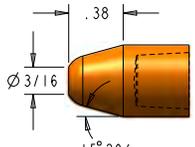
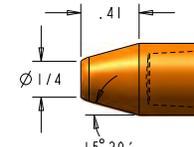
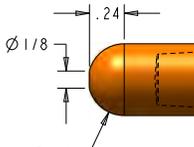
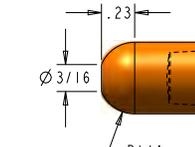
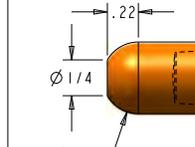
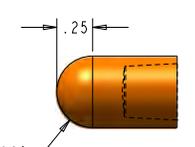
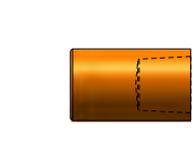
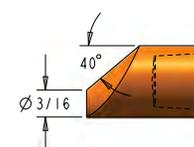
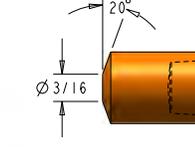
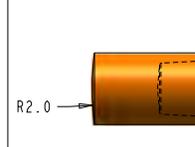
Body Style M

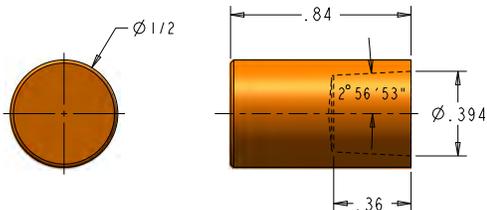


NOTE: Base units come with 1/4-20 screws for mounting & barb fittings.

Spot Welding Caps - Female

CenterLine #4 Caps - 1/2" Diameter - Standard Length

 <p>A Nose CLFA-X4</p>	 <p>A Nose CLFA-X4-250</p>	 <p>B Nose CLFB-X4</p>	 <p>B Nose CLFB-X4-188</p>	 <p>B Nose CLFB-X4-250</p>
 <p>B Nose CLFB-X4-R</p>	 <p>C Nose CLFC-X4</p>	 <p>D Nose CLFD-X4</p>	 <p>E Nose CLFE-X4</p>	 <p>F Nose CLFF-X4</p>

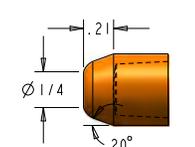
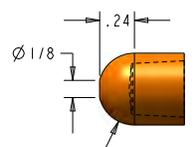
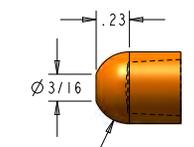
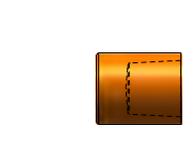
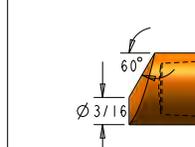
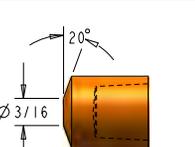
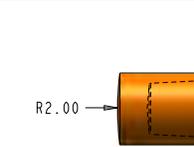


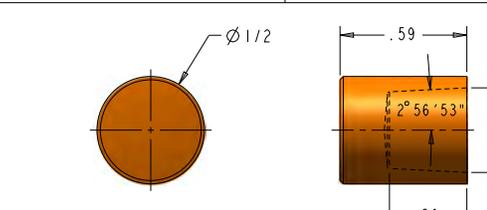
C Nose **CLFC-X4**

CLF C- X 4 (shown)

CenterLine Female Cap
Nose Designation
Material
 2 = Class 2 CuCrZr
 Z = Class 1 CuZr
 G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper
Major Diameter (1/8" increments)

CenterLine #4 Caps - 1/2" Diameter - Short Length

 <p>A Nose CLFA-X4S</p>	 <p>B Nose CLFB-X4S</p>	 <p>B Nose CLFB-X4S-188</p>	 <p>C Nose CLFC-X4S</p>	 <p>D Nose CLFD-X4S</p>
 <p>E Nose CLFE-X4S</p>	 <p>F Nose CLFF-X4S</p>			



C Nose **CLFC-X4S**

CLF C- X 4S (shown)

CenterLine Female Cap
Nose Designation
Material
 2 = Class 2 CuCrZr
 Z = Class 1 CuZr
 G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper
Major Diameter (1/8" increments)
S = Short Overall Length

Female cap material markings will appear internally and/or externally.

Code	Material	Internal Hole	External Marking
2	RWMA Class 2 CuCrZr	✳	
Z	RWMA Class 1 CuZr	⊖	∪
G	RWMA Class 20 GLIDCOP® AL-60	◇	∨

Custom caps are available upon request.

GLIDCOP® is a registered trademark of North American Hogan's High Alloys LLC.

Spot Welding Caps - Female

CenterLine #5 Caps - 5/8" Diameter - Standard Length

 A Nose CLFA-X5	 A Nose CLFA-X5-312	 705 Nose CLFA-X5-705	 B Nose CLFB-X5	 B Nose CLFB-X5-250
 B Nose CLFB-X5-312	 B Nose CLFB-X5-R	 C Nose CLFC-X5	 D Nose CLFD-X5	 E Nose CLFE-X5
 E Nose CLFE-X5-45	 F Nose CLFF-X5	 F Nose CLFF-X5-1	 G Nose CLFG-X5-313	

C Nose CLFC-X5

CenterLine Female Cap
 Nose Designation
 Material
 2 = Class 2 CuCrZr
 Z = Class 1 CuZr
 G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper
 Major Diameter (1/8" increments)

CLF C- X 5 (shown)

CenterLine #5 Caps - 5/8" Diameter - Short Length

 A Nose CLFA-X5S	 B Nose CLFB-X5S	 B Nose CLFB-X5S-250	 C Nose CLFC-X5S	 D Nose CLFD-X5S
 E Nose CLFE-X5S	 E Nose CLFE-X5S-30	 F Nose CLFF-X5S		

C Nose CLFC-X5S

CenterLine Female Cap
 Nose Designation
 Material
 2 = Class 2 CuCrZr
 Z = Class 1 CuZr
 G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper
 Major Diameter (1/8" increments)
 S = Short Overall Length

CLF C- X 5S (shown)

Female cap material markings will appear internally and/or externally.

Code	Material	Internal Hole	External Marking
2	RWMA Class 2 CuCrZr	✱	
Z	RWMA Class 1 CuZr	⊙	∪
G	RWMA Class 20 GLIDCOP® AL-60	◇	∨

Custom caps are available upon request.

GLIDCOP® is a registered trademark of North American Hoganas High Alloys LLC.

Spot Welding Caps - Female

CenterLine #6 Caps - 3/4" Diameter - Standard Length

<p>A Nose CLFA-X6</p>	<p>A Nose CLFA-X6-250</p>	<p>705 Nose CLRG-705X</p>	<p>B Nose CLFB-X6</p>	<p>B Nose CLFB-X6-250</p>
<p>B Nose CLFB-X6-312</p>	<p>B Nose CLFB-X6-R</p>	<p>C Nose CLFC-X6</p>	<p>D Nose CLFD-X6</p>	<p>E Nose CLFE-X6</p>
<p>F Nose CLFF-X6</p>	<p>F Nose CLFF-X6-3</p>	<p style="text-align: right;">CLF C- X 6 (shown)</p> <p>CenterLine Female Cap Nose Designation Material 2 = Class 2 CuCrZr Z = Class 1 CuZr G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper Major Diameter (1/8" increments)</p>		

C Nose CLFC-X6

CenterLine #6 Caps - 3/4" Diameter - Short Length

<p>A Nose CLFA-X6S</p>	<p>Custom Nose CLRG-705SX</p>	<p>B Nose CLFB-X6S</p>	<p>B Nose CLFB-X6S-250</p>	<p>B Nose CLFB-X6S-312</p>
<p>C Nose CLFC-X6S</p>	<p>D Nose CLFD-X6S</p>	<p>E Nose CLFE-X6S</p>	<p style="text-align: right;">CLF C- X 6S (shown)</p> <p>CenterLine Female Cap Nose Configuration Material 2 = Class 2 CuCrZr Z = Class 1 CuZr G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper Major Diameter (1/8" increments) Short Overall Length</p>	

C Nose CLFC-X6S

Custom caps are available upon request.

GLIDCOP® is a registered trademark of North American Hogan's High Alloys LLC.

Female cap material markings will appear internally and/or externally.

Code	Material	Internal Hole	External Marking
2	RWMA Class 2 CuCrZr	✱	
Z	RWMA Class 1 CuZr	⊖	∪
G	RWMA Class 20 GLIDCOP® AL-60	◇	∇

Spot Welding Caps - Female

ISO 13mm Dia. x 18mm Long

 A Nose ISO-5821-AI3X18-X	 B Nose ISO-5821-BI3X18-X	 C Nose ISO-5821-CI3X18-X	 D Nose ISO-5821-DI3X18-X	 E Nose ISO-5821-EI3X18-X
 F Nose ISO-5821-FI3X18-X	 G Nose ISO-5821-GI3X18-X	ISO - 5821 - C13X18-X (shown) Standard ISO Caps Nose Type Cap Diameter (mm) Length (mm) Material A2/2 = Class 2 CuCrZr A2/4 = Class 1 CuZr G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper		

C Nose ISO-5821-CI3X18-X

ISO 16mm x 20mm Long

 A Nose ISO-5821-A16X20-X	 B Nose ISO-5821-B16X20-X	 C Nose ISO-5821-C16X20-X	 D Nose ISO-5821-D16X20-X	 E Nose ISO-5821-E16X20-X
 F Nose ISO-5821-F16X20-X	 G Nose ISO-5821-G16X20-X	 F1 Nose ISO-5821-F1-16-20-50-55-X	 F1 Nose ISO-5821-F1-16-20-50-8-X	

C Nose ISO-5821-C16X20-X

ISO-5821-C16X20-X (shown)

Standard for ISO Caps
 Nose Designation
 Diameter (mm)
 Length (mm)
 Material
A2/2 = Class 2 CuCrZr
A2/4 = Class 1 CuZr
G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper

Female cap material markings will appear internally and/or externally.

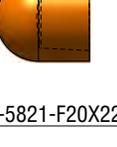
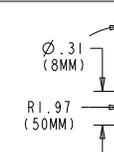
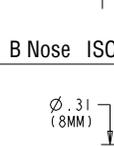
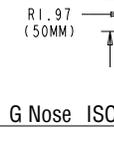
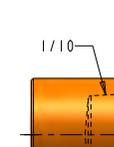
Code	Material	Internal Hole	External Marking
2	RWMA Class 2 CuCrZr	✱	
Z	RWMA Class 1 CuZr	⊕	∪
G	RWMA Class 20 GLIDCOP® AL-60	⊖	∨

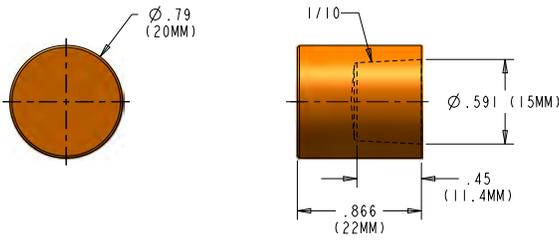
Custom caps are available upon request.

GLIDCOP® is a registered trademark of North American Hogan's High Alloys LLC.

Spot Welding Caps - Female

ISO 20mm x 22mm - Standard Length

 A Nose ISO-5821-A20X22-X	 B Nose ISO-5821-B20X22-X	 C Nose ISO-5821-C20X22-X	 D Nose ISO-5821-D20X22-X	 E Nose ISO-5821-E20X22-X
 F Nose ISO-5821-F20X22-X	 G Nose ISO-5821-G20X22-X	 F1 Nose ISO-5821-F1-20-22-50-7-X	 F1 Nose ISO-5821-F1-20-22-50-8-X	

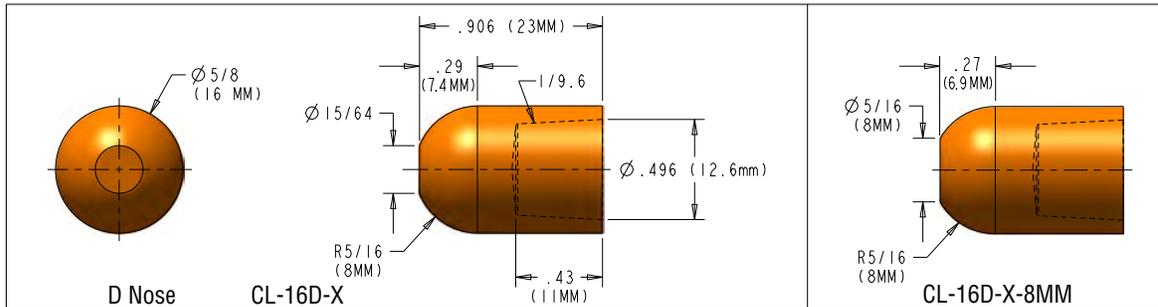


C Nose ISO-5821-C20X22-X

ISO-5821-C20X22-X (shown)

Standard for ISO Caps
 Nose Designation
 Diameter (mm)
 Length (mm)
 Material
A2/2 = Class 2 CuCrZr
A2/4 = Class 1 CuZr
G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper

Asian Style (1/9.6 Taper) 16mm Diameter 23mm Length



CL -16D - X

CenterLine Female Cap
 Diameter (mm)
 Nose Type
 Material
A2/2 = Class 2 CuCrZr
A2/4 = Class 1 CuZr
G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper

Female cap material markings will appear internally and/or externally.

Code	Material	Internal Hole	External Marking
2	RWMA Class 2 CuCrZr	✳	
Z	RWMA Class 1 CuZr	⊖	∪
G	RWMA Class 20 GLIDCOP® AL-60	◇	∨

Custom caps are available upon request.

GLIDCOP® is a registered trademark of North American Hogan's High Alloys LLC.

Spot Welding Caps - Male

CenterLine #4 Caps - 1/2" Diameter - Standard Length

 A Nose WA-X4	 A Nose WA-X4-125	 B Nose WB-X4	 C Nose WC-X4	 D Nose WD-X4
 E Nose WE-X4	 E Nose WE-X4-45	 F Nose WF-X4-2	 WC - X4 (shown)	

CenterLine Male Cap
 Nose Type
 Material
 2 = Class 2 CuCrZr
 Z = Class 1 CuZr
 G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper
 Major Diameter (1/8" increments)

C Nose WC-X4

CenterLine #5 Caps - 5/8" Diameter - Standard Length

 A Nose WA-X5	 A Nose WA-X5-190	 A Nose WA-X5-312	 705 Nose WA-X5-705	 B Nose WB-X5
 B Nose WB-X5-250	 B Nose WB-X5-312	 B Nose WB-X5-R	 C Nose WC-X5	 D Nose WD-X5
 D Nose WD-X5-190	 E Nose WE-X5	 E Nose WE-X5-312	 E Nose WE-X5-312-45	 E Nose WE-X5-45
 F Nose WF-X5-2	 C Nose WC-X5		 WC- X 5 (shown)	

CenterLine Male Cap
 Nose Designation
 Material
 2 = Class 2 CuCrZr
 Z = Class 1 CuZr
 G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper
 Major Diameter (1/8" increments)

Male cap material markings will appear externally.

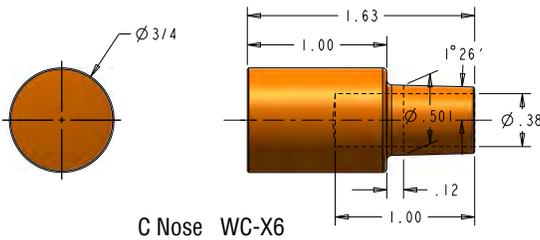
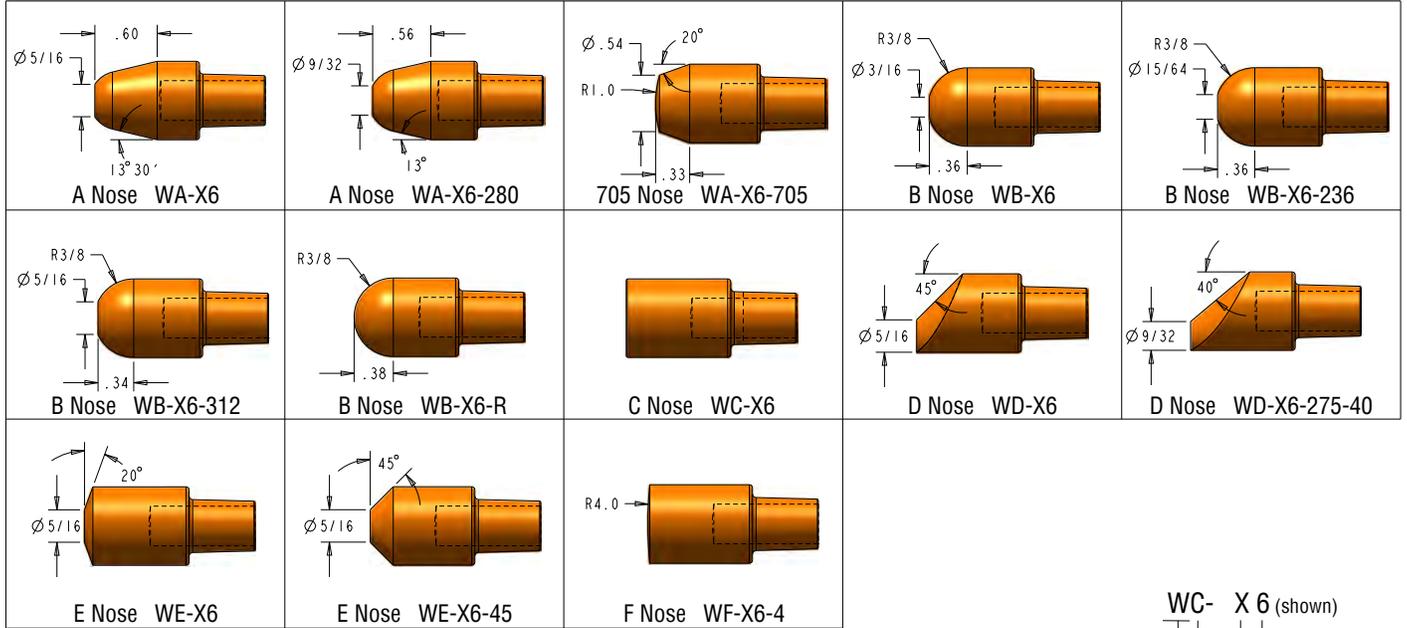
Code	Material	External Marking
2	RWMA Class 2 CuCrZr	
Z	RWMA Class 1 CuZr	⌒
G	RWMA Class 20 GLIDCOP® AL-60	∨

Custom caps are available upon request.

GLIDCOP® is a registered trademark of North American Hoganas High Alloys LLC.

Spot Welding Caps - Male

CenterLine #6 Caps - 3/4" Diameter - Standard Length



WC- X 6 (shown)

CenterLine Male Cap
 Nose Designation
 Material
 2 = Class 2 CuCrZr
 Z = Class 1 CuZr
 G = Class 20 Glidcop® AL-60,
 Dispersion Strengthened Copper
 Major Diameter (1/8" increments)

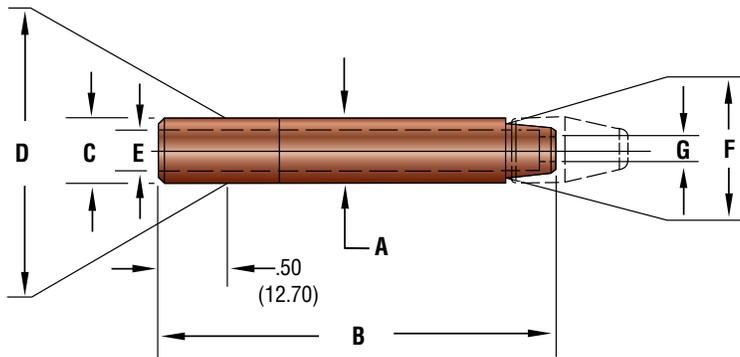
Custom caps are available upon request.

GLIDCOP® is a registered trademark of North American Hogan's High Alloys LLC.

Male cap material markings will appear externally.

Code	Material	External Marking
2	RWMA Class 2 CuCrZr	
Z	RWMA Class 1 CuZr	∪
G	RWMA Class 20 GLIDCOP® AL-60	∨

Straight Male Adapters for Female Caps



(Material RWMA Class 2 & 3)

- Dimensions Shown Are: inches (mm).

KEY TO ITEM NUMBERS

- CLF - Adapter Designation
- 2 or 3 - RWMA Alloy Class
- 4 Thru 7 - RW Taper Number
- 05 Thru 16 - Overall Length in .25 (6.35) Increments
- T - Thru Water Hole
- Delete "T" If Blind Hole Is Required

EXAMPLE:

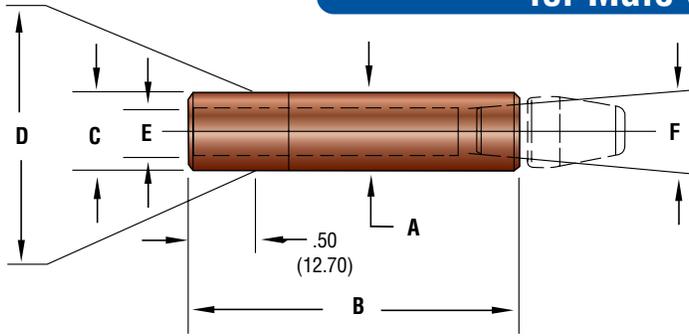
**MALE ADAPTER, CLASS 2, RW 6 TAPER,
2.50 (63.50) O.A.L., THRU WATER HOLE**

• CLF - 2610T

- ADDITIONAL LENGTHS ARE AVAILABLE UPON REQUEST.

ITEM NO.	DIMENSIONS							
	CLASS 2	A Major Diameter	B Shank Overall Length	C Minor Taper Diameter	D Gauging Taper Diameter	E Water Hole Diameter	F Cap End Taper Diameter	G Taper Water Hole Diameter
CLF-2405T		.482 (12.24)	1.25 (31.75)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2406T		.482 (12.24)	1.50 (38.10)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2407T		.482 (12.24)	1.75 (44.45)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2408T		.482 (12.24)	2.00 (50.80)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2409T		.482 (12.24)	2.25 (57.15)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2410T		.482 (12.24)	2.50 (63.50)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2411T		.482 (12.24)	2.75 (69.85)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2412T		.482 (12.24)	3.00 (76.20)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2413T		.482 (12.24)	3.25 (82.55)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2414T		.482 (12.24)	3.50 (88.90)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2415T		.482 (12.24)	3.75 (95.25)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2416T		.482 (12.24)	4.00 (101.60)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)
CLF-2506T		.625 (15.88)	1.43 (36.32)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2507T		.625 (15.88)	1.68 (42.67)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2508T		.625 (15.88)	1.93 (49.02)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2509T		.625 (15.88)	2.18 (55.37)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2510T		.625 (15.88)	2.43 (61.72)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2511T		.625 (15.88)	2.68 (68.02)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2512T		.625 (15.88)	2.93 (74.42)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2513T		.625 (15.88)	3.18 (80.77)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2514T		.625 (15.88)	3.43 (87.12)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2515T		.625 (15.88)	3.68 (93.47)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2516T		.625 (15.88)	3.93 (99.82)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.265 (6.73)
CLF-2608T		.750 (19.05)	2.00 (50.80)	.706 (17.93)	.731 (18.57)	.38 (9.53)	.633 (16.08)	.343 (8.71)
CLF-2610T		.750 (19.05)	2.50 (63.50)	.706 (17.93)	.731 (18.57)	.38 (9.53)	.633 (16.08)	.343 (8.71)
CLF-2612T		.750 (19.05)	3.00 (76.20)	.706 (17.93)	.731 (18.57)	.38 (9.53)	.633 (16.08)	.343 (8.71)
CLF-2614T		.750 (19.05)	3.50 (88.90)	.706 (17.93)	.731 (18.57)	.38 (9.53)	.633 (16.08)	.343 (8.71)
CLF-2616T		.750 (19.05)	4.00 (101.60)	.706 (17.93)	.731 (18.57)	.38 (9.53)	.633 (16.08)	.343 (8.71)
CLF-2708T		.875 (22.23)	2.00 (50.80)	.819 (20.80)	.844 (21.44)	.38 (9.53)	.633 (16.08)	.343 (8.71)
CLF-2710T		.875 (22.23)	2.50 (63.50)	.819 (20.80)	.844 (21.44)	.38 (9.53)	.633 (16.08)	.343 (8.71)
CLF-2712T		.875 (22.23)	3.00 (76.20)	.819 (20.80)	.844 (21.44)	.38 (9.53)	.633 (16.08)	.343 (8.71)
CLF-2714T		.875 (22.23)	3.50 (88.90)	.819 (20.80)	.844 (21.44)	.38 (9.53)	.633 (16.08)	.343 (8.71)
CLF-2716T		.875 (22.23)	4.00 (101.60)	.819 (20.80)	.844 (21.44)	.38 (9.53)	.633 (16.08)	.343 (8.71)

Straight Female Adapters for Male Caps



(Material RWMA Class 2 & 3)
 • Dimensions Shown Are: inches (mm).

KEY TO ITEM NUMBERS

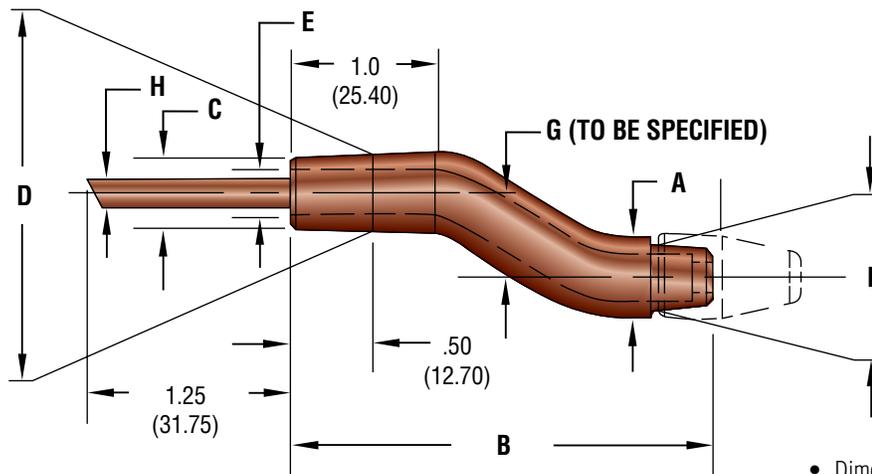
- WG -** Adapter Designation
- 2 or 3 -** RWMA Alloy Class
- 4 Thru 7 -** RW Taper Number
- 05 Thru 16 -** Overall Length in .25 (6.35) Increments

EXAMPLE:
FEMALE ADAPTER, CLASS 3, RW 4 TAPER,
1.25 (31.75) O.A.L.

• **WG - 3405**

ITEM NO.	DIMENSIONS					
CLASS 2	A	B	C	D	E	F
	Major Diameter	Shank Overall Length	Minor Taper Diameter	Gauging Taper Diameter	Water Hole Diameter	Major Female Taper Diameter
WG-2405	.482 (12.24)	1.25 (31.75)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2406	.482 (12.24)	1.50 (38.10)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2407	.482 (12.24)	1.75 (44.45)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2408	.482 (12.24)	2.00 (50.80)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2409	.482 (12.24)	2.25 (57.15)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2410	.482 (12.24)	2.50 (63.50)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2411	.482 (12.24)	2.75 (69.85)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2412	.482 (12.24)	3.00 (76.20)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2413	.482 (12.24)	3.25 (82.55)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2414	.482 (12.24)	3.50 (88.90)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2415	.482 (12.24)	3.75 (95.25)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2416	.482 (12.24)	4.00 (101.60)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)
WG-2505	.625 (15.88)	1.25 (31.75)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2506	.625 (15.88)	1.50 (38.10)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2507	.625 (15.88)	1.75 (44.45)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2508	.625 (15.88)	2.00 (50.80)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2509	.625 (15.88)	2.25 (57.15)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2510	.625 (15.88)	2.50 (63.50)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2511	.625 (15.88)	2.75 (69.85)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2512	.625 (15.88)	3.00 (76.20)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2513	.625 (15.88)	3.25 (82.55)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2514	.625 (15.88)	3.50 (88.90)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2515	.625 (15.88)	3.75 (95.25)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2516	.625 (15.88)	4.00 (101.60)	.588 (14.94)	.613 (15.57)	.38 (9.53)	.415 (10.54)
WG-2608	.750 (19.05)	2.00 (50.80)	.706 (17.93)	.731 (18.57)	.44 (11.11)	.501 (12.73)
WG-2610	.750 (19.05)	2.50 (63.50)	.706 (17.93)	.731 (18.57)	.44 (11.11)	.501 (12.73)
WG-2612	.750 (19.05)	3.00 (76.20)	.706 (17.93)	.731 (18.57)	.44 (11.11)	.501 (12.73)
WG-2614	.750 (19.05)	3.50 (88.90)	.706 (17.93)	.731 (18.57)	.44 (11.11)	.501 (12.73)
WG-2616	.750 (19.05)	4.00 (101.60)	.706 (17.93)	.731 (18.57)	.44 (11.11)	.501 (12.73)
WG-2708	.875 (22.23)	2.00 (50.80)	.819 (20.80)	.844 (21.44)	.50 (12.70)	.613 (15.57)
WG-2710	.875 (22.23)	2.50 (63.50)	.819 (20.80)	.844 (21.44)	.50 (12.70)	.613 (15.57)
WG-2712	.875 (22.23)	3.00 (76.20)	.819 (20.80)	.844 (21.44)	.50 (12.70)	.613 (15.57)
WG-2714	.875 (22.23)	3.50 (88.90)	.819 (20.80)	.844 (21.44)	.50 (12.70)	.613 (15.57)
WG-2716	.875 (22.23)	4.00 (101.60)	.819 (20.80)	.844 (21.44)	.50 (12.70)	.613 (15.57)

Offset Male Adapters for Female Caps



• Dimensions Shown Are: inches (mm).

(Material RWMA Class 2 & 3)

ITEM NO.	DIMENSIONS							
	A CLASS 2 Major Diameter	B Shank Overall Length	C Minor Taper Diameter	D Gauging Taper Diameter	E Water Hole Diameter	F Cap End Taper Diameter	G Offset	H Water Tube Diameter
CLF-2410-04T	.482 (12.24)	2.50 (63.50)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)	.19 (4.76)
CLF-2411-04T	.482 (12.24)	2.75 (69.85)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)	.19 (4.76)
CLF-2412-04T	.482 (12.24)	3.00 (76.20)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)	.19 (4.76)
CLF-2413-04T	.482 (12.24)	3.25 (82.55)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.25 (6.35)	.19 (4.76)
CLF-2410-08T	.482 (12.24)	2.50 (63.50)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.50 (12.70)	.19 (4.76)
CLF-2411-08T	.482 (12.24)	2.75 (69.85)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.50 (12.70)	.19 (4.76)
CLF-2412-08T	.482 (12.24)	3.00 (76.20)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.50 (12.70)	.19 (4.76)
CLF-2413-08T	.482 (12.24)	3.25 (82.55)	.588 (14.94)	.463 (11.76)	.28 (7.14)	.402 (10.21)	.50 (12.70)	.19 (4.76)
CLF-2510-04T	.625 (15.88)	2.50 (63.50)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.25 (6.35)	.25 (6.35)
CLF-2511-04T	.625 (15.88)	2.75 (69.85)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.25 (6.35)	.25 (6.35)
CLF-2512-04T	.625 (15.88)	3.00 (76.20)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.25 (6.35)	.25 (6.35)
CLF-2513-04T	.625 (15.88)	3.25 (82.55)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.25 (6.35)	.25 (6.35)
CLF-2510-08T	.625 (15.88)	2.50 (63.50)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.50 (12.70)	.25 (6.35)
CLF-2511-08T	.625 (15.88)	2.75 (69.85)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.50 (12.70)	.25 (6.35)
CLF-2512-08T	.625 (15.88)	3.00 (76.20)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.50 (12.70)	.25 (6.35)
CLF-2513-08T	.625 (15.88)	3.25 (82.55)	.588 (14.94)	.613 (15.57)	.34 (8.73)	.502 (12.75)	.50 (12.70)	.25 (6.35)

FOR ALL OTHER ITEMS:

- Check Key To Item Numbers For Availability
- Use Example For Ordering Available Items

• **ADDITIONAL LENGTHS ARE AVAILABLE UPON REQUEST.**

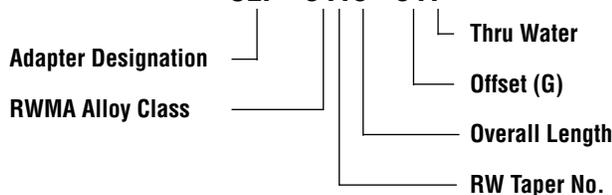
EXAMPLE:

**MALE ADAPTER, CLASS 3,
RW 4 TAPER, 2.50 (63.50) O.A.L., .25 (6.35) OFFSET, THRU WATER HOLE**

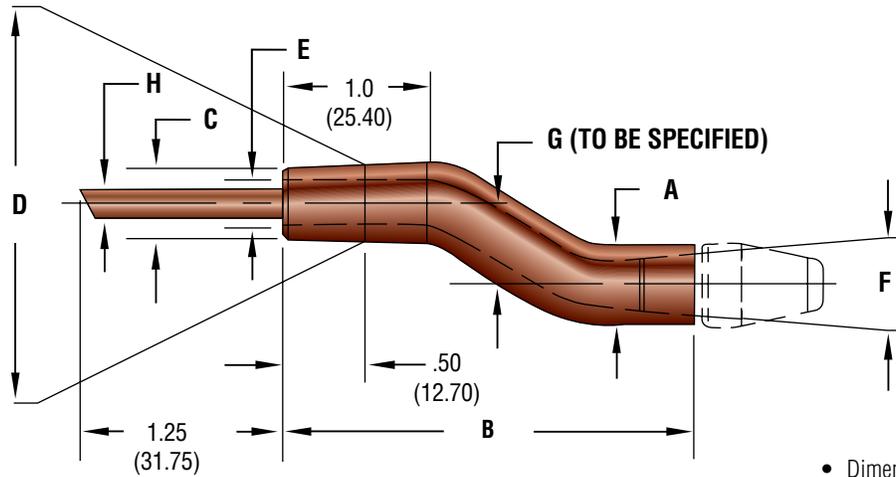
KEY TO ITEM NUMBERS

- CLF -** Adapter Designation
- 2 or 3 -** RWMA Alloy Class
- 4 Thru 6 -** RW Taper Number
- 10 Thru 20 -** Overall Length in .25 (6.35) Increments
- 04 Thru 16 -** Offset in 1/16 (1.59) Increments
- T -** Thru Water Hole
Delete "T" If Blind Hole Is Required

• **CLF - 3410 - 04T**



Offset Female Adapters for Male Caps



• Dimensions Shown Are: inches (mm).

(Material RWMA Class 2 & 3)

ITEM NO.	DIMENSIONS							
CLASS 2	A	B	C	D	E	F	G	H
	Major Diameter	Shank Overall Length	Minor Taper Diameter	Gauging Taper Diameter	Water Hole Diameter	Cap End Taper Diameter	Offset	Water Tube Diameter
WG-2410-04	.482 (12.24)	2.50 (63.50)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)	.25 (6.35)	.19 (4.76)
WG-2411-04	.482 (12.24)	2.75 (69.85)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)	.25 (6.35)	.19 (4.76)
WG-2412-04	.482 (12.24)	3.00 (76.20)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)	.25 (6.35)	.19 (4.76)
WG-2413-04	.482 (12.24)	3.25 (82.55)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)	.25 (6.35)	.19 (4.76)
WG-2410-08	.482 (12.24)	2.50 (63.50)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)	.50 (12.70)	.19 (4.76)
WG-2411-08	.482 (12.24)	2.75 (69.85)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)	.50 (12.70)	.19 (4.76)
WG-2412-08	.482 (12.24)	3.00 (76.20)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)	.50 (12.70)	.19 (4.76)
WG-2413-08	.482 (12.24)	3.25 (82.55)	.438 (11.13)	.463 (11.76)	.28 (7.14)	.375 (9.53)	.50 (12.70)	.19 (4.76)
WG-2510-04	.625 (15.88)	2.50 (63.50)	.588 (14.94)	.613 (15.57)	.38 (9.65)	.415 (10.54)	.25 (6.35)	.25 (6.35)
WG-2511-04	.625 (15.88)	2.75 (69.85)	.588 (14.94)	.613 (15.57)	.38 (9.65)	.415 (10.54)	.25 (6.35)	.25 (6.35)
WG-2512-04	.625 (15.88)	3.00 (76.20)	.588 (14.94)	.613 (15.57)	.38 (9.65)	.415 (10.54)	.25 (6.35)	.25 (6.35)
WG-2513-04	.625 (15.88)	3.25 (82.55)	.588 (14.94)	.613 (15.57)	.38 (9.65)	.415 (10.54)	.25 (6.35)	.25 (6.35)
WG-2510-08	.625 (15.88)	2.50 (63.50)	.588 (14.94)	.613 (15.57)	.38 (9.65)	.415 (10.54)	.50 (12.70)	.25 (6.35)
WG-2511-08	.625 (15.88)	2.75 (69.85)	.588 (14.94)	.613 (15.57)	.38 (9.65)	.415 (10.54)	.50 (12.70)	.25 (6.35)
WG-2512-08	.625 (15.88)	3.00 (76.20)	.588 (14.94)	.613 (15.57)	.38 (9.65)	.415 (10.54)	.50 (12.70)	.25 (6.35)
WG-2513-08	.625 (15.88)	3.25 (82.55)	.588 (14.94)	.613 (15.57)	.38 (9.65)	.415 (10.54)	.50 (12.70)	.25 (6.35)

FOR ALL OTHER ITEMS:

- Check Key To Item Numbers For Availability
- Use Example For Ordering Available Items

KEY TO ITEM NUMBERS

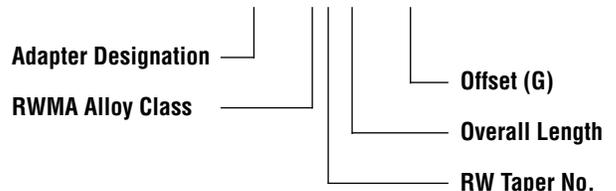
- WG -** Adapter Designation
- 2 or 3 -** RWMA Alloy Class
- 4 Thru 6 -** RW Taper Number
- 10 Thru 20 -** Overall Length in .25 (6.35) Increments
- 04 Thru 16 -** Offset in 1/16 (1.59) Increments

• **ADDITIONAL LENGTHS ARE AVAILABLE UPON REQUEST.**

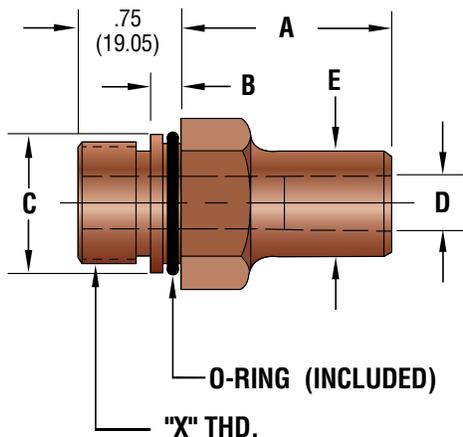
EXAMPLE:

**FEMALE ADAPTER, CLASS 2,
RW 5 TAPER, 3.25 (82.55) O.A.L., 1.0 (25.40) OFFSET.**

• **WG - 2513 - 16**



Straight Thread Hex Adapters



• Dimensions Shown Are: inches (mm).

TAPER NO.	D	Minimum A		
		7/8-14	1-12	1-1/4-12
#4RW	0.463 (11.76)	0.125	0.125	0.125
#5RW	0.625 (15.88)	0.125	0.125	0.125
#6RW	0.750 (19.05)	1.00	0.25	0.25
#7RW	0.875 (22.35)	1.50	1.25	0.50

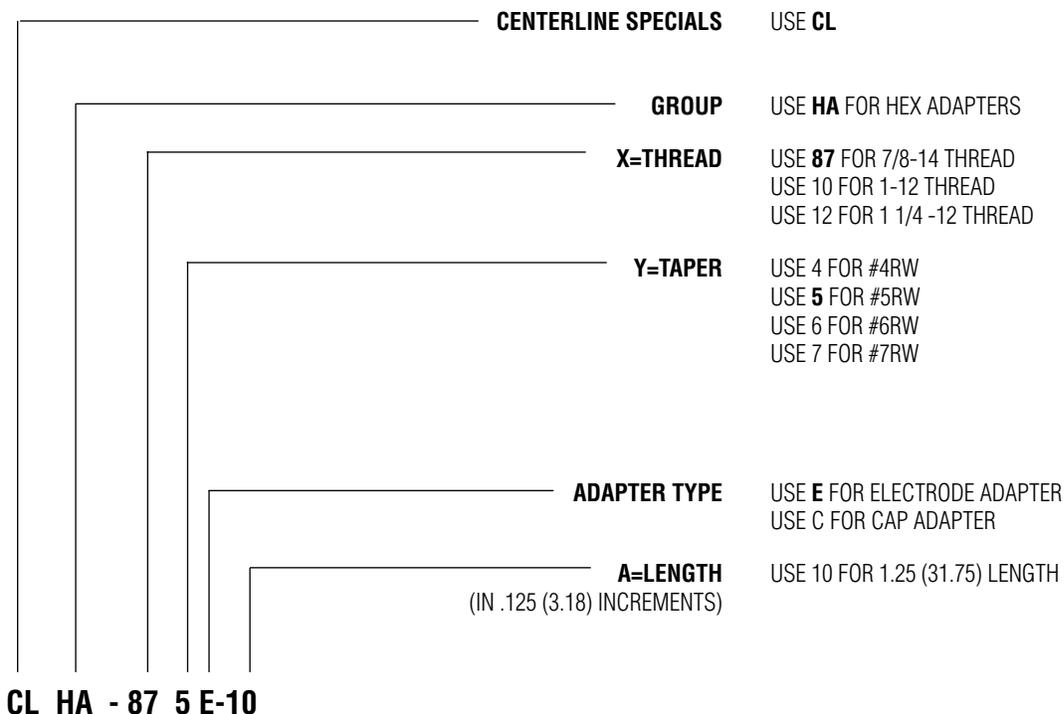
THREAD	"X"	B	C	HEX	O-RING	E
7/8-14	87	0.25 (6.35)	1 (25.40)	1-1/4	SLORD-117	1.22
1-12	10	0.25 (6.35)	1.13 (28.58)	1-1/4	SLORD-119	1.22
1-1/4-12	12	0.25 (6.35)	1.38 (34.93)	1-1/2	SLORD-123	1.47

EXAMPLE:

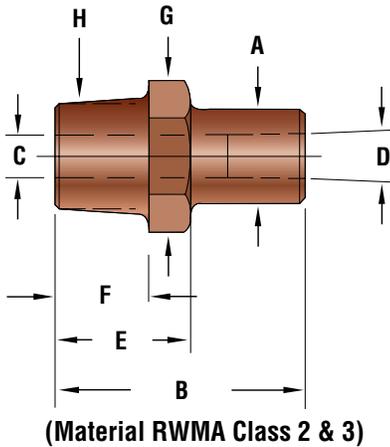
• **CLHA - 875E-10**

HEX ADAPTER, 7/8-14 THD., #5RW TAPER, ELECTRODE ADAPTER, LENGTH = 1.25 (31.75).

EXAMPLE EXPLANATION CODING

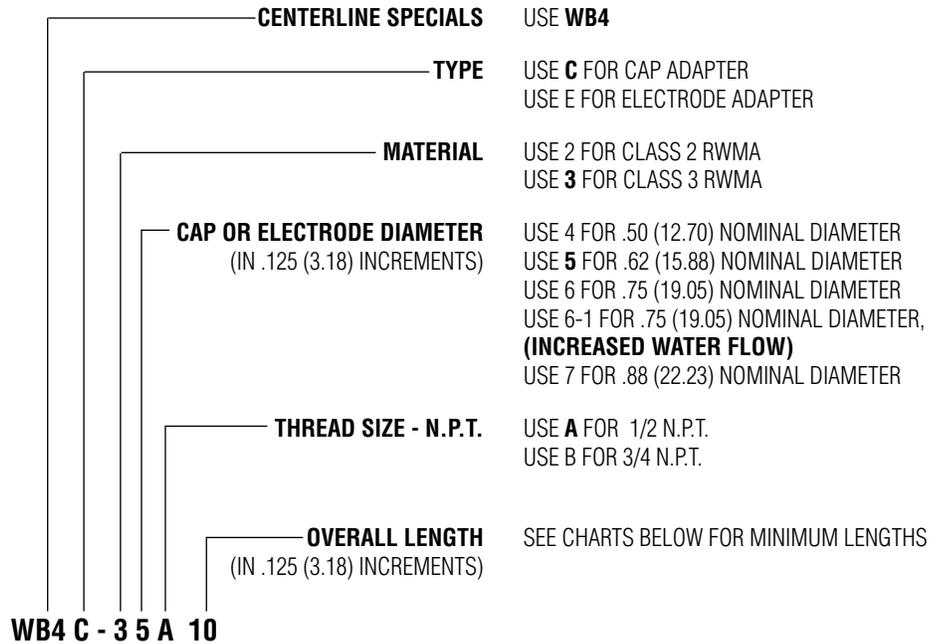


Cap and Electrode Hex Adapters Pipe Thread



• Dimensions Shown Are: inches (mm).

EXAMPLE EXPLANATION CODING



EXAMPLE:

- **WB4C-35A10**

Electrode Adapter Chart

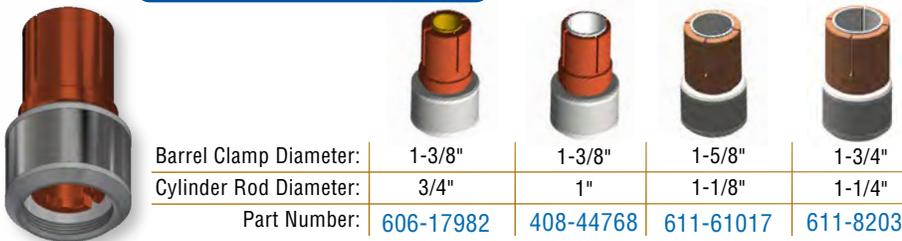
ELECTRODE CODE	4	5	5	6	7
A- DIAMETER	0.88 (22.35)	0.94 (23.88)	0.94 (23.88)	1.09 (27.69)	1.24 (31.50)
B- LENGTH	AS CODED				
LENGTH (Minimum)	0.88 (22.35)	0.88 (22.35)	1.12 (28.45)	1.12 (28.45)	1.38 (35.05)
C- HOLE DIAMETER	0.42 (10.67)	0.44 (11.18)	0.44 (11.18)	0.50 (12.70)	0.56 (14.22)
D- TAPER DIAMETER	0.463 (11.76)	0.625 (15.88)	0.625 (15.88)	0.750 (19.05)	0.875 (22.22)
E- HEX LENGTH	0.88 (22.35)	0.88 (22.35)	1.38 (35.05)	1.38 (35.05)	1.38 (35.05)
F- THREAD LENGTH	0.62 (15.75)	0.62 (15.75)	0.88 (22.35)	0.88 (22.35)	0.88 (22.35)
G- HEX	1.00 (25.40)	1.00 (25.40)	1.25 (31.75)	1.25 (31.75)	1.25 (31.75)
H- THREAD (N.P.T.)	1/2	1/2	3/4	3/4	3/4

Cap Adapter Chart

ELECTRODE CODE	4	5	5	6	6-1	7
A- DIAMETER	0.50 (12.70)	0.62 (15.75)	0.62 (15.75)	0.75 (19.05)	0.75 (19.05)	0.88 (22.35)
B- LENGTH	AS CODED					
LENGTH (Minimum)	0.88 (22.35)	0.88 (22.35)	1.12 (28.45)	1.12 (28.45)	1.12 (28.45)	1.12 (28.45)
C- HOLE DIAMETER	0.28 (7.11)	0.38 (9.65)	0.38 (9.65)	0.44 (11.18)	0.44 (11.18)	0.56 (14.22)
D- TAPER DIAMETER	0.375 (9.52)	0.415 (10.54)	0.415 (10.54)	0.501 (12.72)	0.564 (14.32)	0.613 (15.57)
E- HEX LENGTH	0.88 (22.35)	0.88 (22.35)	1.38 (35.05)	1.38 (35.05)	1.38 (35.05)	1.38 (35.05)
F- THREAD LENGTH	0.62 (15.75)	0.62 (15.75)	0.88 (22.35)	0.88 (22.35)	0.88 (22.35)	0.88 (22.35)
G- HEX	1.00 (25.40)	1.00 (25.40)	1.25 (31.75)	1.25 (31.75)	1.25 (31.75)	1.25 (31.75)
H- THREAD (N.P.T.)	1/2	1/2	3/4	3/4	3/4	3/4

Quick Change Electrodes

Quick Change Barrel



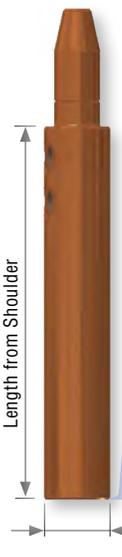
Barrel Clamp Diameter:	1-3/8"	1-3/8"	1-5/8"	1-3/4"
Cylinder Rod Diameter:	3/4"	1"	1-1/8"	1-1/4"
Part Number:	606-17982	408-44768	611-61017	611-82033

Quick Change Clamp



Part Number: 408-44601

Quick Change Adapter



Adapter Type
Quick Change
Port Thread Type
Adapter Diameter
Taper or Thread Code
Length from Shoulder

WPTA QC BP E 10S 060

Adapter Type
Straight Adapter=SA (with tapered end)
Water Proof Thread Adapter=WPTA (with threaded end)

Quick Change

Port Thread Type
1/8" BSPT = BT
1/8" BSPP = BP
1/8" NPT = NT

Length from Shoulder (measured in mm. Minimum 60 mm)
Example: If this length is 60 mm, the number in this field will be 060.

Taper Code
1316 ISO 1/10
1620
2025
4E RWMA SHANK
5E
6E
4C RWMA CAP
5C
6C

Thread Code
87S = for 7/8"-14 thread
10S = for 1"-12 thread

Adapter Diameter
for SA: N = Ø 1 1/8"
E = Ø 30 mm
for WPTA: N = Ø 1 1/4"
E = Ø 32 mm

Water Tube



Water Tube Type Tube Length Increments

CLT 1900 12

Water Tube = CLT

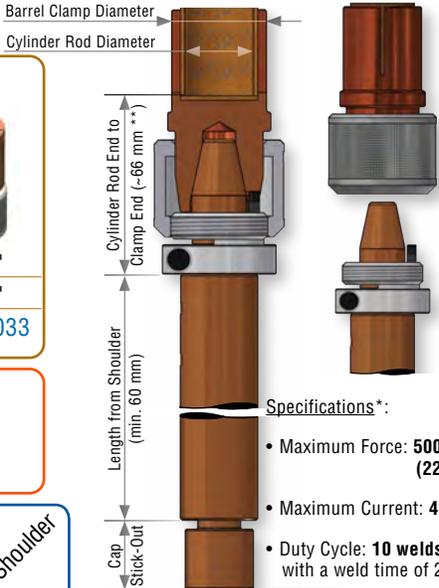
Type

Tube Length Increments (total length of tube, measured in 1/8" increments.)
To determine the number of 1/8" increments (for the length of the water tube), apply the following formula: "Length from Shoulder" x 0.315 - 7 (see the Quick Change Adapter part numbering system above for the "Length from Shoulder"). Then, round the result to the closest whole number and write that number in the current field.
Example (if "Length from Shoulder" = 60 mm, as above): 60 x 0.315 - 7 = 18.9 - 7 = 11.9 Rounded up, the number in this field will be 12, as the length of the tube would be 12 increments of 1/8".

Backup Electrode



Options include: Backup Electrode only, Backup Electrode and Hex Adapter, or Hex Electrode only.

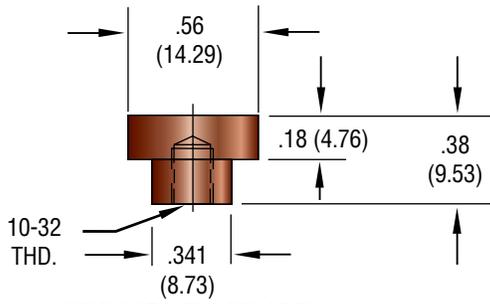


Barrel Clamp Diameter
Cylinder Rod Diameter
Cylinder Rod End to Clamp End (~66 mm)**
Length from Shoulder (min. 60 mm)
Cap Slick-Out

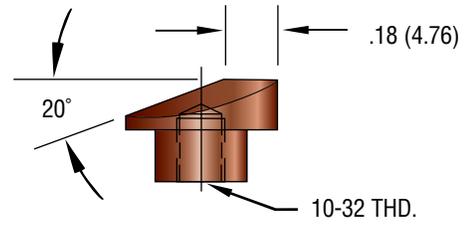
Specifications*:
• Maximum Force: 5000 lbs (22 kN)
• Maximum Current: 45 kA
• Duty Cycle: 10 welds/min. with a weld time of 200 ms

* For parameters outside these specifications, please contact CenterLine.
** For reference only.

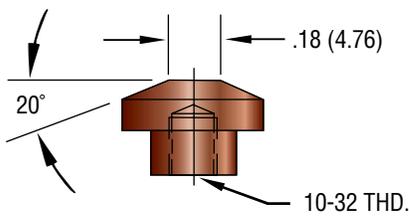
Replaceable Button Caps



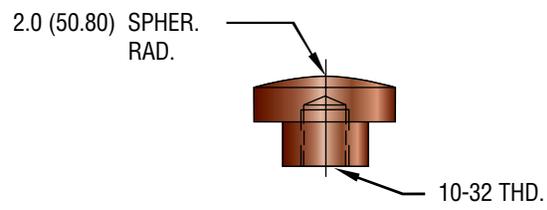
"C" NOSE - No. XC-2998



"D" NOSE - No. XD-2998

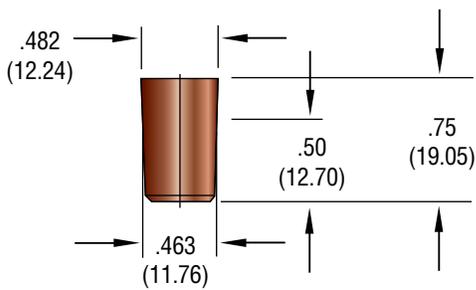


"E" NOSE - No. XCT-2998

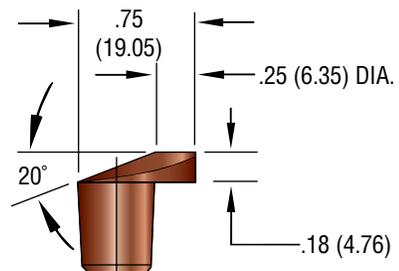


"F" NOSE - No. XR-2998

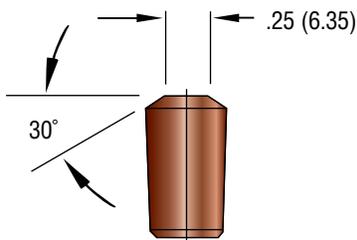
(Material RWMA Class 2)



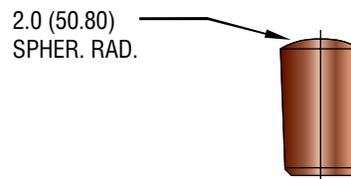
"C" NOSE - No. CLPC-2998



"D" NOSE - No. CLPD-2998



"E" NOSE - No. CLPT-2998



"F" NOSE - No. CLPR-2998

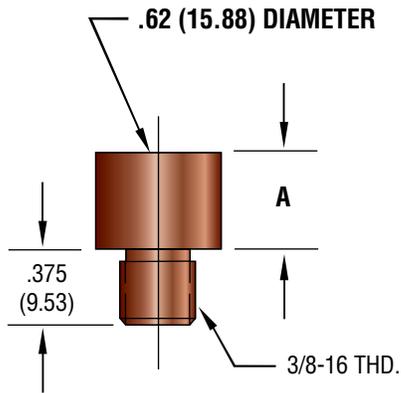
(Material RWMA Class 2)

- Dimensions Shown Are: inches (mm).

Button Caps

EXAMPLE – CLR2-78-AY

CLR2-78 = RWMA Class 2
 CLR3-78 = RWMA Class 3
 CLRZ-78 = Zirconium

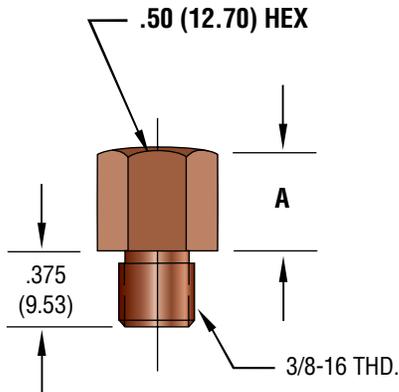


(Material RWMA Class 2, 3 & Zirconium)

Item No.	"A" = Height
CLR2-78-31C	.312 (7.92)
CLR2-78-37C	.375 (9.53)
CLR2-78-43C	.437 (11.10)
CLR2-78-50C	.500 (12.70)
CLR2-78-62C	.625 (15.88)
CLR2-78-75C	.750 (19.05)
ETC.	See Example

EXAMPLE – CLH3-78-AY

CLH2-78 = RWMA Class 2
 CLH3-78 = RWMA Class 3



(Material RWMA Class 2 & 3)

"Y" = NOSE DESIGNATION

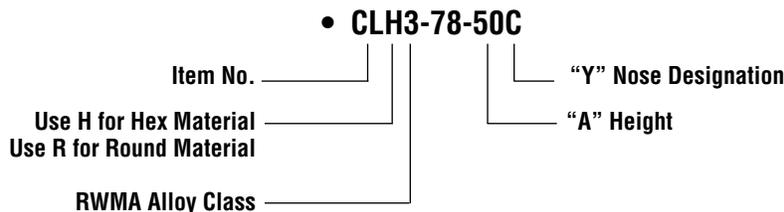
- * A = Pointed
- * B = Dome
- C = Flat (Shown)
- * E = Truncated (20°)
- F = .62 (15.88) Radius

* 0.25(6.35) Weld Face Diameter

• Dimensions Shown Are: inches (mm).

EXAMPLE:

.50 (12.70) HEX, CLASS 3, "A" = .50 (12.70) HEIGHT, C = FLAT NOSE.

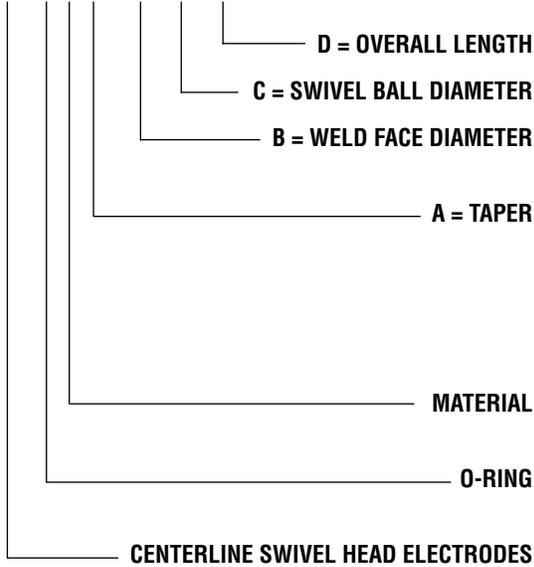


NOTE: Other thread sizes and shapes are available.

Swivel Head Electrodes with Water-Cooled Shanks

CODING EXAMPLE

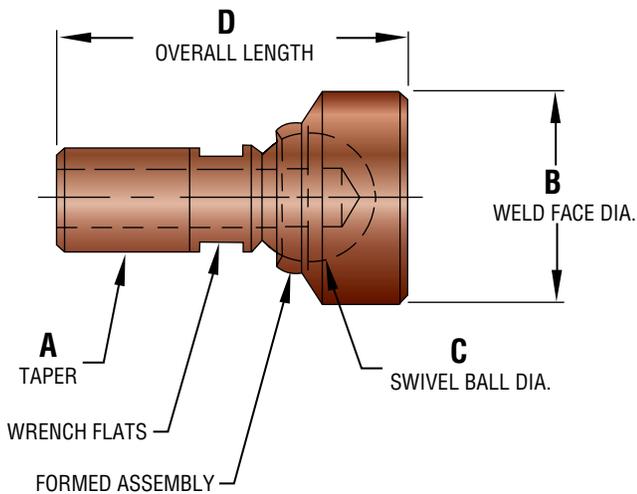
SHEA 0 2 5E XXX ZZ YYY



SPECIFY REQUIRED LENGTH, EX. FOR 2.00 (50.80) USE 200
 SWIVEL BALL DIAMETER APPLICATION DEPENDANT
 SPECIFY REQUIRED DIAMETER, EX. FOR 1.00 (25.40) DIAMETER USE 100
 USE 5C FOR #5 CAP TAPER
 USE 6C FOR #6 CAP TAPER
 USE 4E FOR #4RW TAPER
 USE **5E** FOR #5RW TAPER
 USE 6E FOR #6RW TAPER
 USE 7E FOR #7RW TAPER
 USE **2** FOR CLASS 2
 USE 3 FOR CLASS 3
 USE **0** IF O-RING REQUIRED ON FORMED ASSEMBLY
 OMIT 0 IF O-RING NOT REQUIRED
 USE **SHEA** FOR FORMED ASSEMBLY

Blind Hole

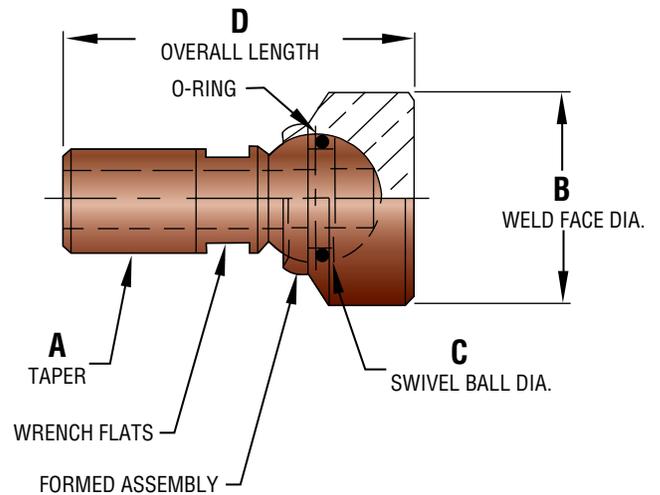
EXAMPLE:
 • SHEA25E10075200



(Material RWMA Class 2&3)

Thru Hole with O-Ring

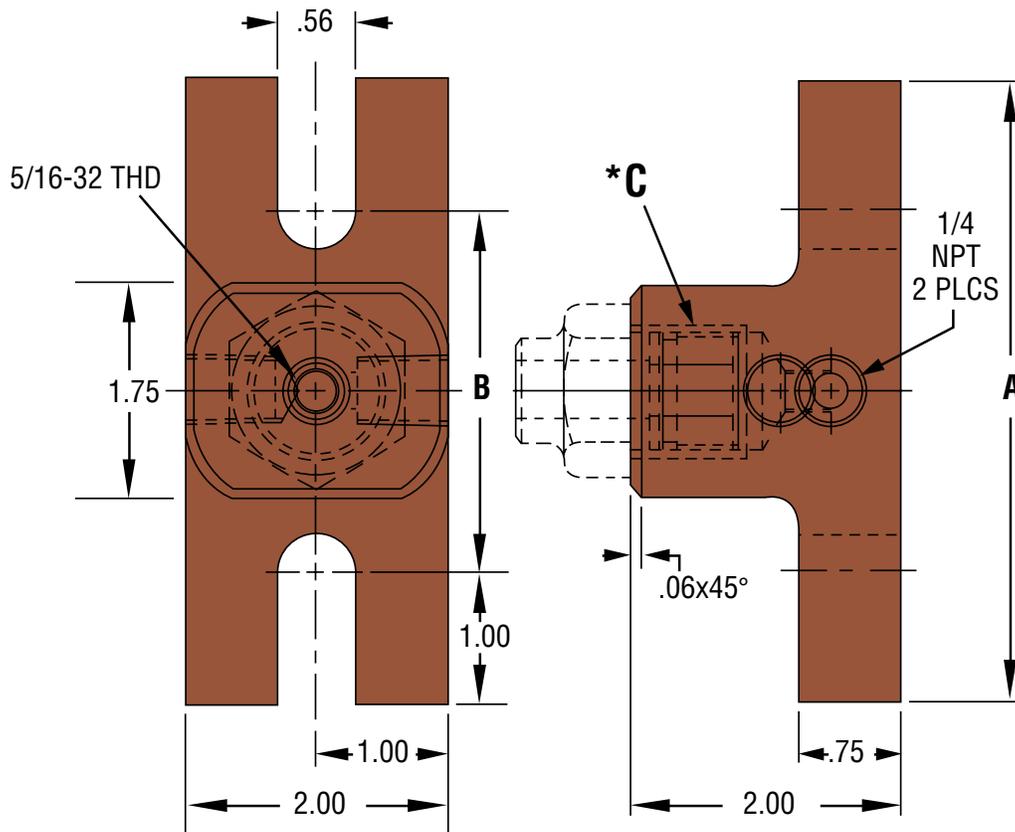
EXAMPLE:
 • SHEA025E10075200
 O-RING



(Material RWMA Class 2&3)

• Dimensions Shown Are: inches (mm).

Platen Mount Holders



(Material RWMA Class 2)

DIM.	CL-1-PM-"X"	CL-2-PM-"X"
A	4.75 (120.65)	7.00 (177.80)
B	2.75 (69.85)	4.31 (109.47)

C*	X
For these thread/taper types	Replace "X" with
1/2 Pipe Thread	50P
5/8 Pipe Thread	62P
3/4 Pipe Thread	75P
7/8-14 Straight Thread	87S
1-12 Straight Thread	10S
#4RW Taper	4E
#5RW Taper	5E
#6RW Taper	6E
#7RW Taper	7E
*Other threads/tapers available upon request	

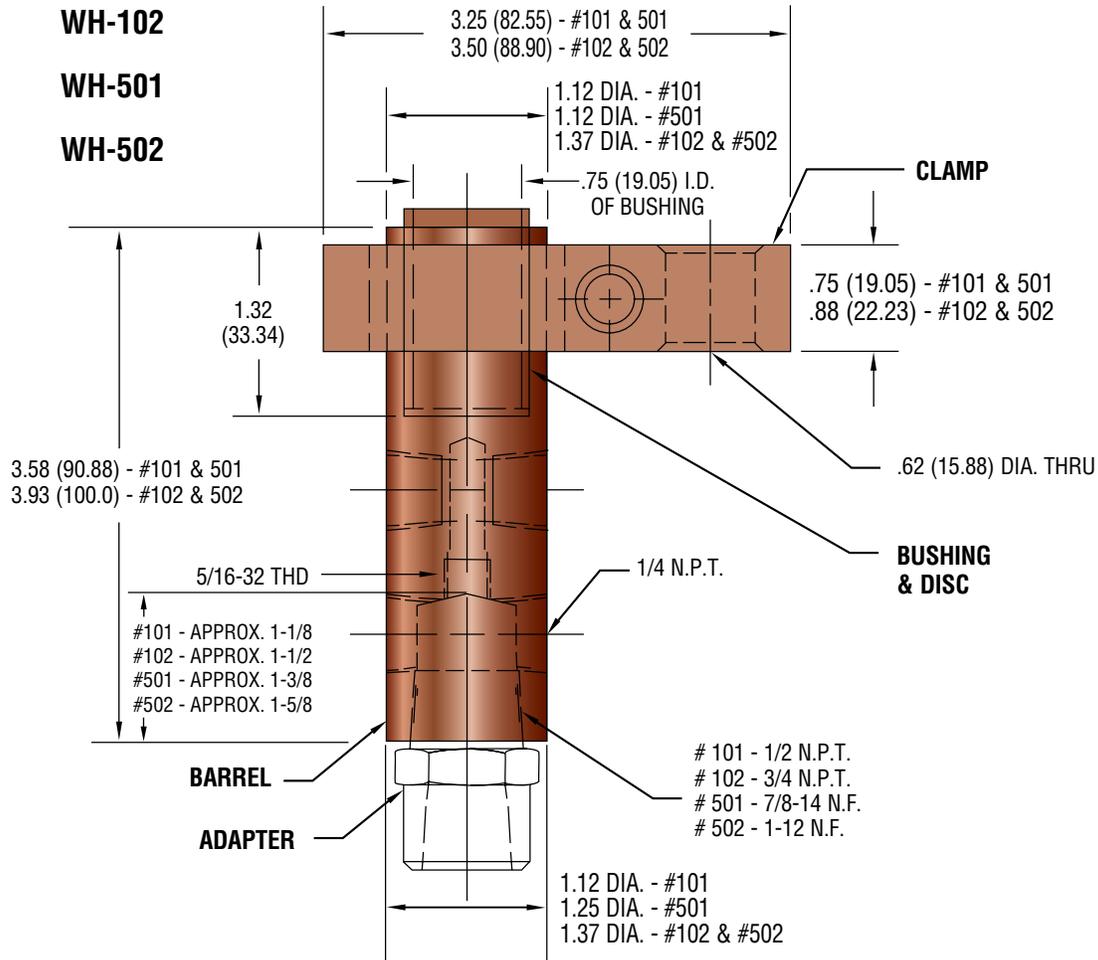
Cylinder Mounted Holders

ITEM NO. WH-101

WH-102

WH-501

WH-502



• Dimensions Shown Are: inches (mm).

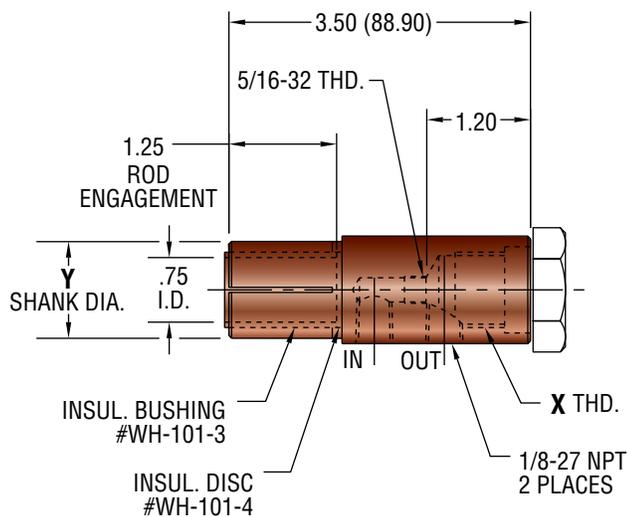
(Material - Copper)

101, 102, 501 & 502 SERIES HOLDERS

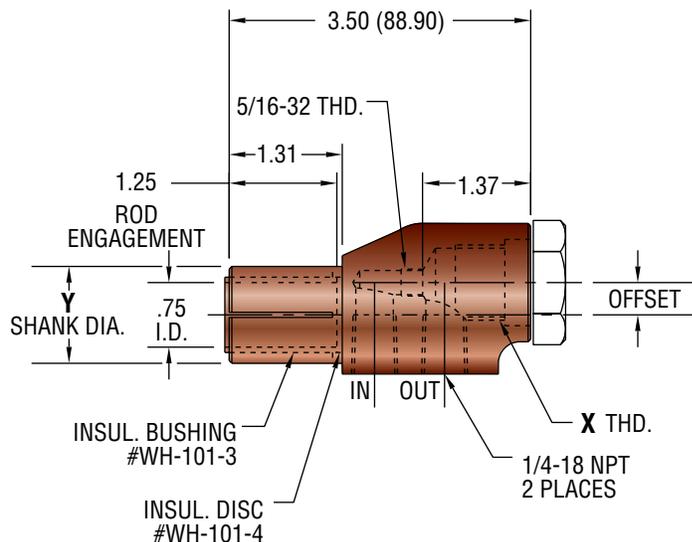
DETAILS	1/2 N.P.T.	3/4 N.P.T.	7/8-14 N.F.	1-12 N.F.
ASSEMBLY NO.*	WH-1010C	WH-1020C	WH-5010C	WH-5020C
BARREL	WH-101-1	WH-102-1	WH-501-1	WH-502-1
CLAMP NO.	WH-101-2	WH-102-2	WH-101-2	WH-102-2
BUSHING NO.	WH-101-3	WH-101-3	WH-101-3	WH-101-3
DISC NO.	WH-101-4	WH-101-4	WH-101-4	WH-101-4

*A complete assembly consists of a barrel, clamp, bushing, and disc.

Cylinder Mounted Holders

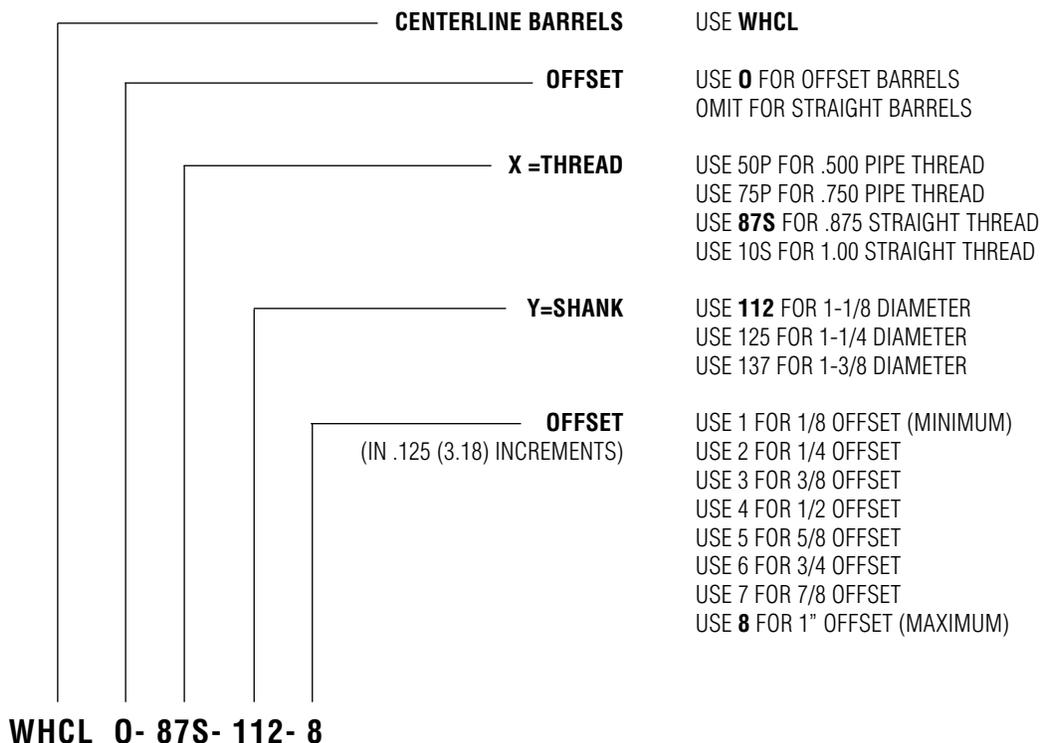


**(Material RWMA Class 2)
Straight Barrel (WHCL Series)**

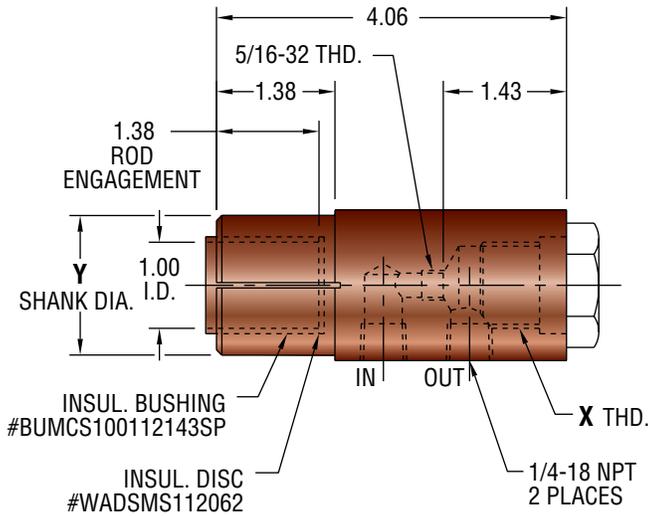


**(Material RWMA Class 3)
Offset Barrel (WHCLO Series)**

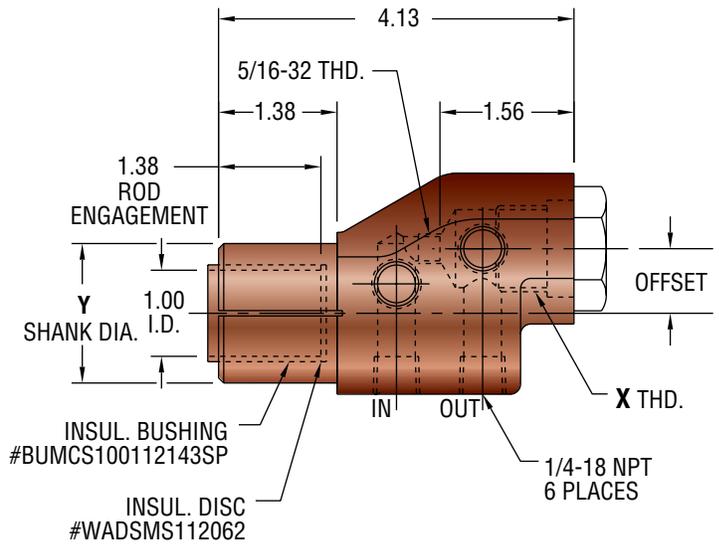
EXAMPLE EXPLANATION CODING



Heavy Duty Cylinder Mounted Holders

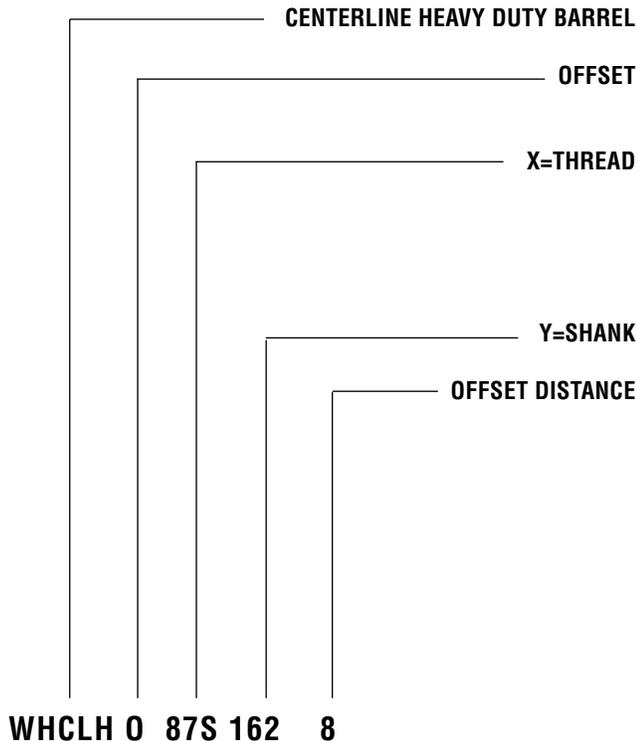


(Material RWMA Class 2)
HEAVY DUTY STRAIGHT BARREL
 (WHCLH Series)



(Material RWMA Class 3)
HEAVY DUTY OFFSET BARREL
 (WHCLHO Series)

EXAMPLE EXPLANATION CODING



USE **WHCLH**

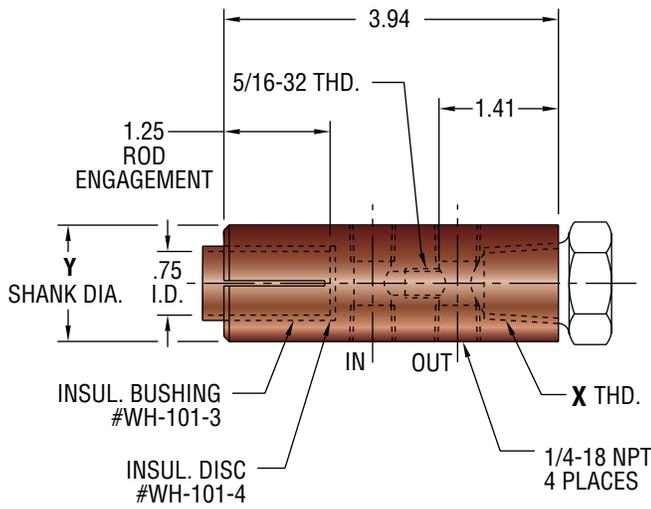
USE **0** FOR OFFSET BARRELS
 OMIT FOR STRAIGHT BARRELS

USE **50P** FOR .500 PIPE THREAD
 USE **75P** FOR .750 PIPE THREAD
 USE **87S** FOR .875 STRAIGHT THREAD
 USE **10S** FOR 1.00 STRAIGHT THREAD
 USE **12S** FOR 1.25 STRAIGHT THREAD

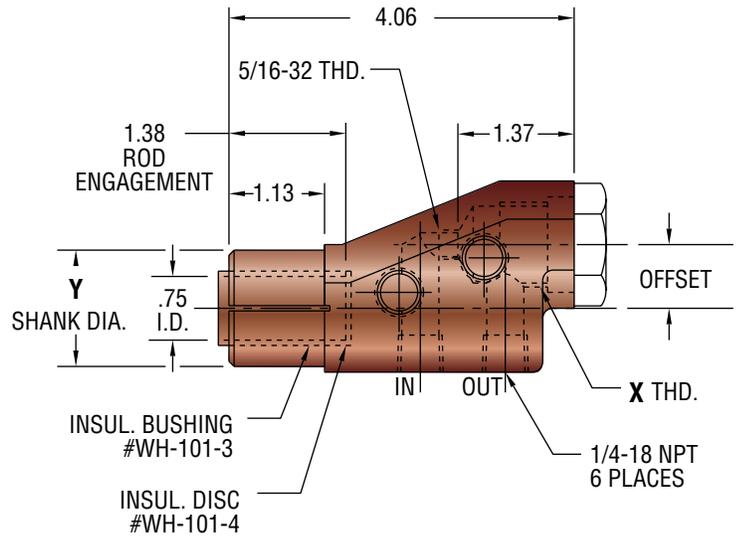
USE **162** FOR 1-5/8 DIAMETER

USE **1** FOR 1/8 OFFSET (MINIMUM)
 USE **2** FOR 1/4 OFFSET
 USE **3** FOR 3/8 OFFSET
 USE **4** FOR 1/2 OFFSET
 USE **5** FOR 5/8 OFFSET
 USE **6** FOR 3/4 OFFSET
 USE **7** FOR 7/8 OFFSET
 USE **8** FOR 1" OFFSET (MAXIMUM)

Light Duty Cylinder Mounted Holders

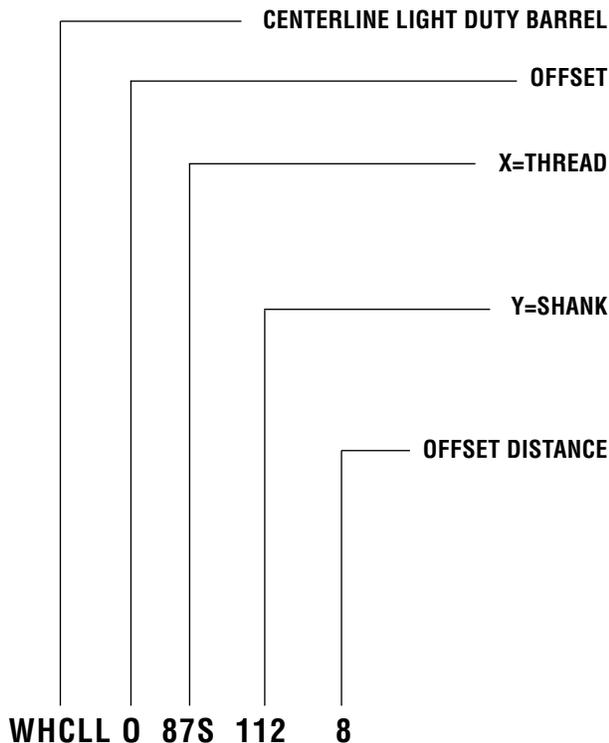


(Material RWMA Class 2)
LIGHT DUTY STRAIGHT BARREL
(WHCLL Series)



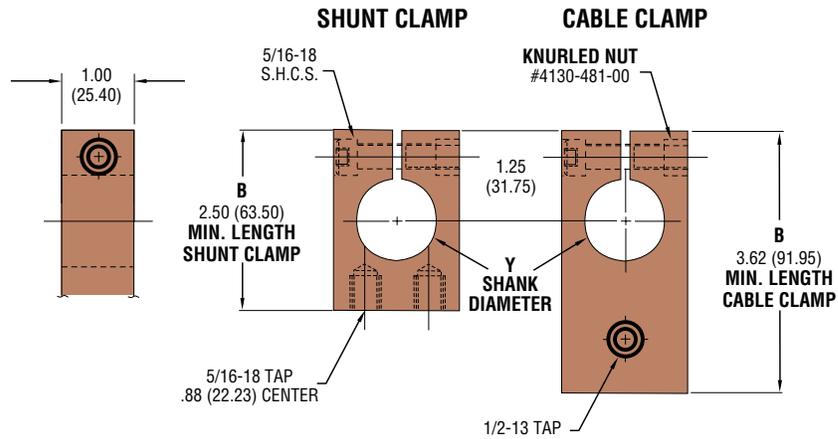
(Material RWMA Class 3)
LIGHT DUTY OFFSET BARREL
(WHCLLO Series)

EXAMPLE EXPLANATION CODING

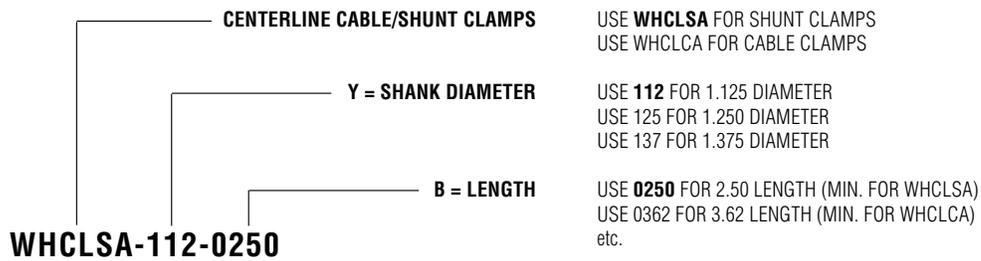


- USE **WHCLL**
- USE **0** FOR OFFSET BARRELS
OMIT FOR STRAIGHT BARRELS
- USE **50P** FOR .500 PIPE THREAD
USE **75P** FOR .750 PIPE THREAD
USE **87S** FOR .875 STRAIGHT THREAD
USE **10S** FOR 1.00 STRAIGHT THREAD
- USE **112** FOR 1-1/8 DIAMETER
USE **125** FOR 1-1/4 DIAMETER
USE **137** FOR 1-3/8 DIAMETER
- USE **1** FOR 1/8 OFFSET (MINIMUM)
USE **2** FOR 1/4 OFFSET
USE **3** FOR 3/8 OFFSET
USE **4** FOR 1/2 OFFSET
USE **5** FOR 5/8 OFFSET
USE **6** FOR 3/4 OFFSET
USE **7** FOR 7/8 OFFSET
USE **8** FOR 1" OFFSET (MAXIMUM)

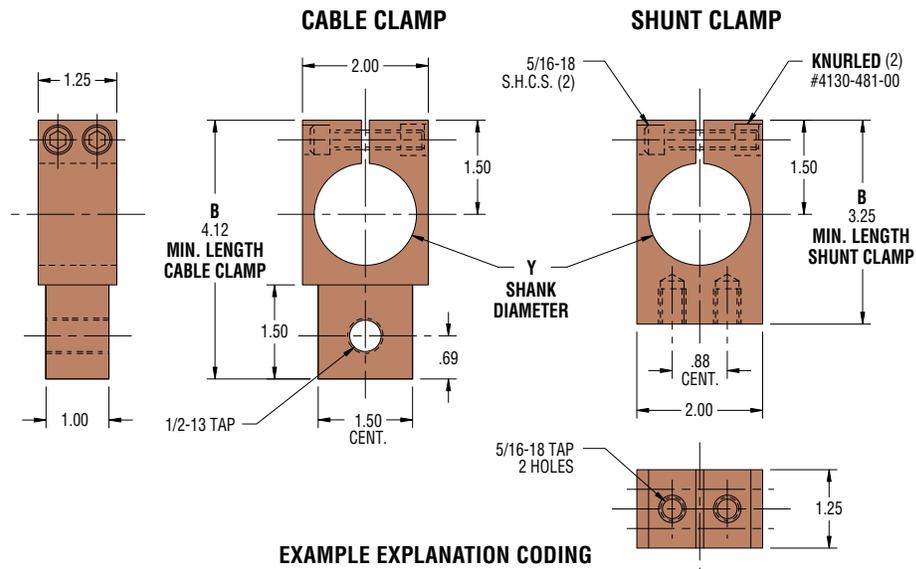
Light Duty Shunt/Cable Clamps



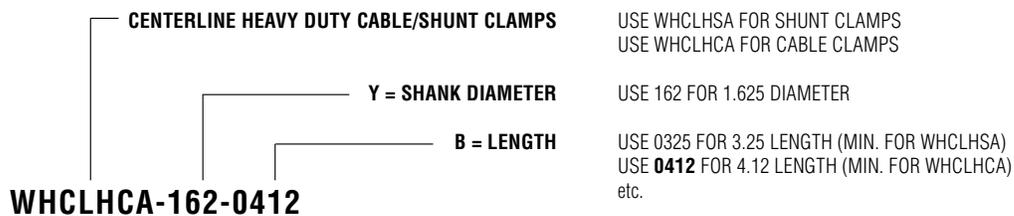
EXAMPLE EXPLANATION CODING



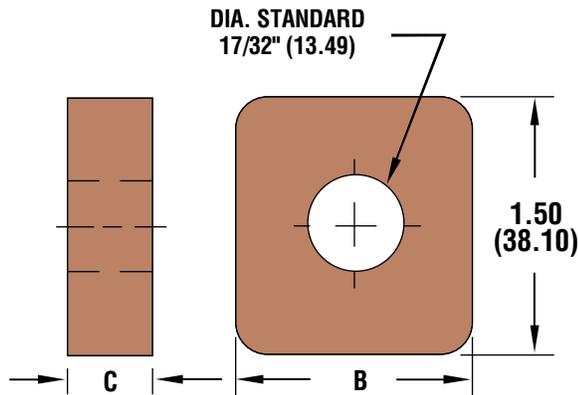
Heavy Duty Shunt/Cable Clamps



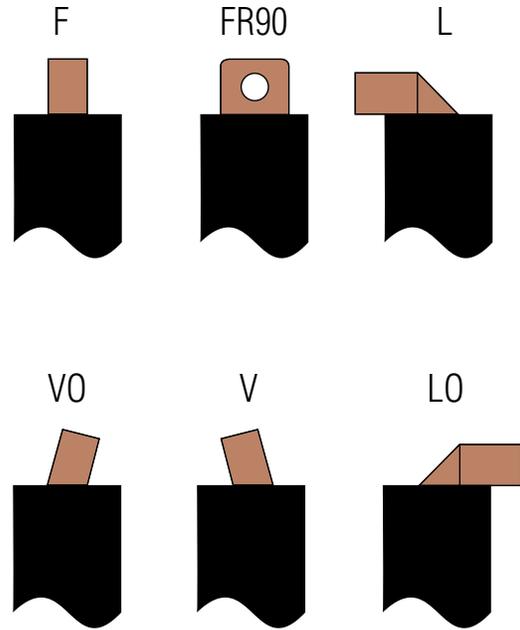
EXAMPLE EXPLANATION CODING



Air-Cooled Jumper Cables



END STYLES

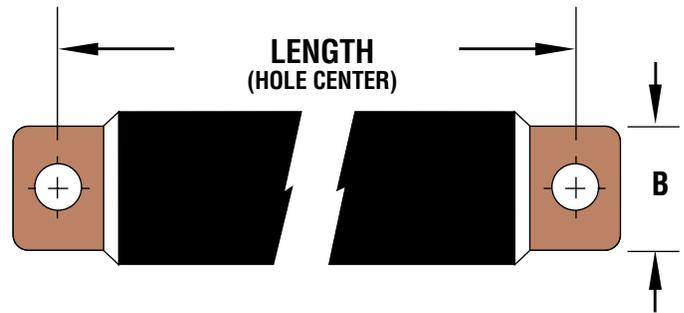


TERMINAL DIMENSIONS			
MCM	Jacket O.D.	B	C
600	1.63 (41.28)	1.38 (34.93)	.500 (12.70)
750	1.75 (44.45)	1.38 (34.93)	.600 (15.24)
1000	2.00 (50.80)	1.50 (38.10)	.700 (17.78)
1200	2.12 (53.98)	1.50 (38.10)	.820 (20.83)
1500	2.25 (57.15)	1.50 (38.10)	.990 (25.15)

HOW TO ORDER CENTERLINE AIR-COOLED CABLES

Please Supply the Following Information:

TERMINALS				
TYPE	1ST END	2ND END	M.C.M.	LENGTH
CLAC	F	F	600	20 (508.0)



EXAMPLE:

CLAC - FF - 600 - 20

CENTERLINE AIR-COOLED JUMPER CABLES 20 (508.1) LENGTH (HOLE CENTRE)

FF END STYLES 600 MCM SIZE

• WATER-COOLED JUMPER CABLES ALSO AVAILABLE UPON REQUEST

• Dimensions Shown Are: inches (mm).

Laminated Shunts

CenterLine shunts are designed to custom specifications and are readily available in a wide variation of hole patterns & sizes.

- The secondary conductor strips are made of high conductivity copper.
- Shunts are normally supplied with their ends secured by riveted copper clips.
- Shunts are now available with a protective covering.



To order shunts, complete the fillable digital copy of this form on the CenterLine website. Email the completed form to: customerservice@cntrline.com

Shunt Type & Dimensions

Specify inches or mm for all dimensions.

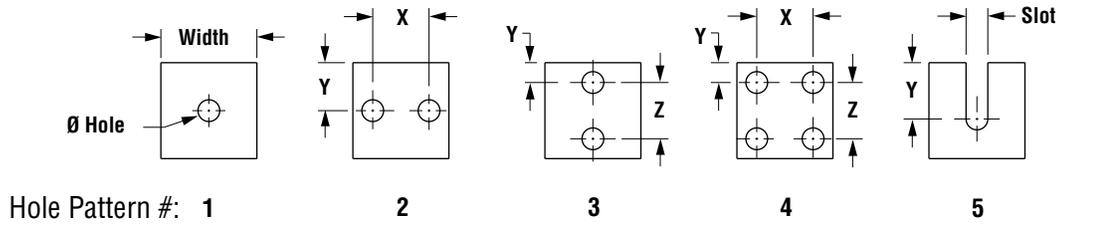
Select Shunt Type

Dimension A

Dimension B

L (Longest Sheet)

Shunt Specifications



	End 1	End 2
Hole Pattern #		
X Dim.		
Y Dim.		
Z Dim.		
Hole/Slot Size		

Clip Length

End 1 Outside	<input type="text"/>
End 1 Inside	<input type="text"/>
End 2 Outside	<input type="text"/>
End 2 Inside	<input type="text"/>

Shunt Thickness

<input type="checkbox"/>	0.50" (10.3 mm)
<input type="checkbox"/>	0.63" (16.0 mm)
<input type="checkbox"/>	0.75" (19.0 mm)
Other:	<input type="text"/>

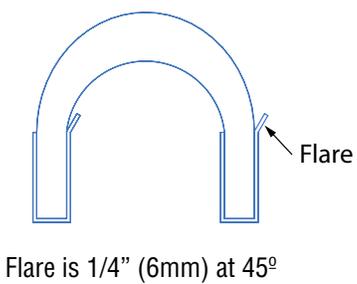
Clip Thickness

1/16" (1.6 mm) Standard

Other (specify)

Flare

- Inside Flare
- End 1
 - End 2
 - None
 - Other
- Outside Flare
- End 1
 - End 2
 - None
 - Other



Shunt Width

<input type="checkbox"/>	1.00" (25 mm)
<input type="checkbox"/>	1.25" (32.0 mm)
<input type="checkbox"/>	1.50" (38.0 mm)
<input type="checkbox"/>	2.00" (51.0 mm)
Other:	<input type="text"/>

Shunt Insulation

Insulation required:

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No
Other:	<input type="text"/>

Provide any additional information or special instructions.

Water Tubes

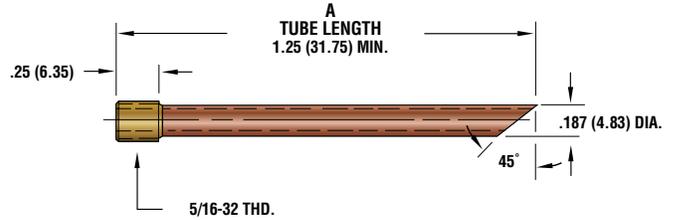
PART NUMBER CODING

- Indicate Desired Tube Length "A" - In .12 (3.18) Increments
Example: TYPE "G" WITH 1.50 (38.10) LENGTH

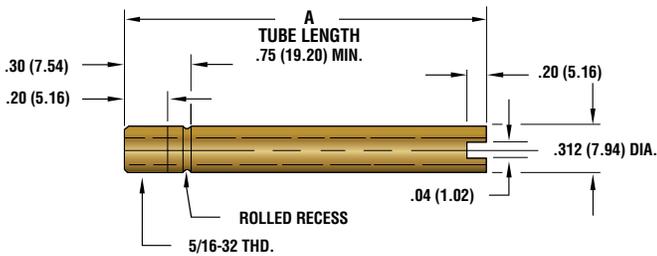
CLT - 1700 -12

Item No. _____ "A" Tube Length

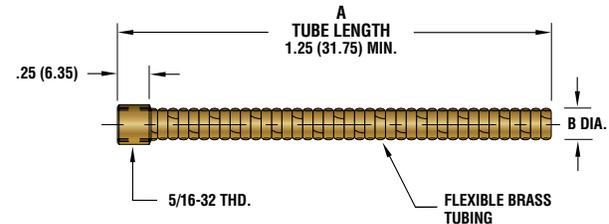
CLT-1500- TYPE "E" (Use with 4 RW Electrodes)
(Material - Copper & Brass)



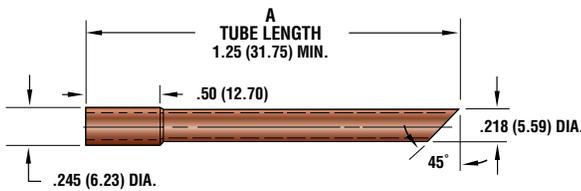
CLT-1000- TYPE "A" (Use with Telescoping Tubes Type "B" & "C")
(Material - 1/4 ID BRASS TUBE)



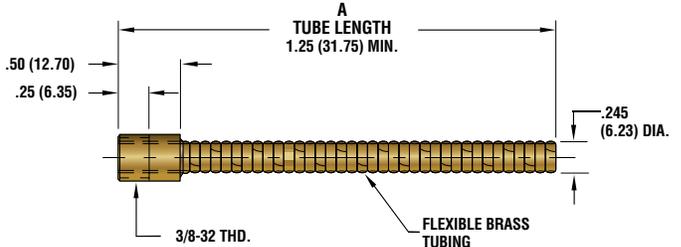
CLT-1600- TYPE "F" B = 0.210 (5.31) DIA.
CLT-1700- TYPE "G" B = 0.250 (6.35) DIA.
(Material - Interlocked Flexible Brass)



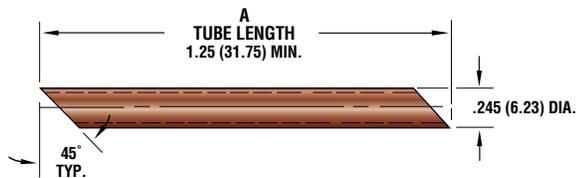
CLT-1200- TYPE "B" (Use with 4 RW Electrodes)
(Material - Copper)



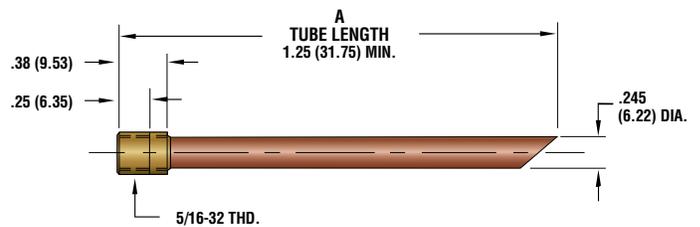
CLT-1800- TYPE "H"
(Material - Interlocked Flexible Brass)



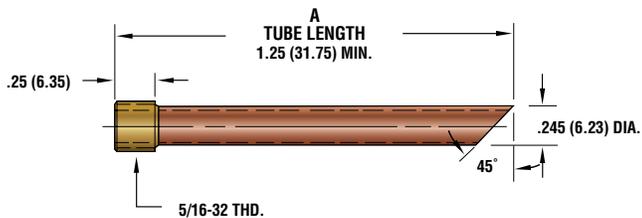
CLT-1300- TYPE "C" (Use with 5,6 & 7 RW Electrodes)
(Material - Copper)



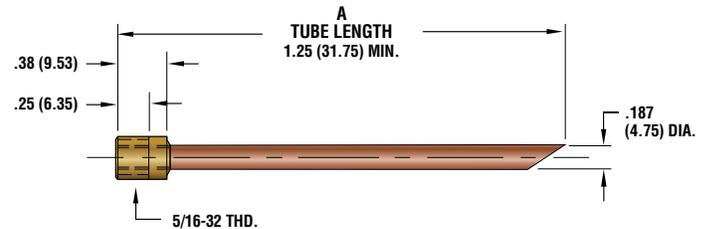
CLT-1900- TYPE "I" (Use with 5,6 & 7 RW Electrodes)
(Material - Copper & Brass)



CLT-1400- TYPE "D" (Use with 5,6 & 7 RW Electrodes)
(Material - Copper & Brass)



CLT-2000- TYPE "J" (Use with 5,6 & 7 RW Electrodes)
(Material - Copper & Brass)



• Dimensions Shown Are: inches (mm).

CLWG Straight Acting Integration Kit

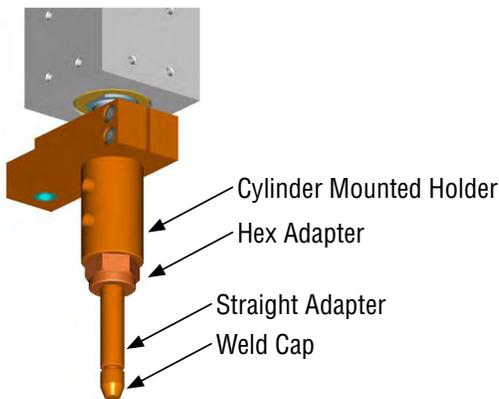
CLWG Straight Acting Integration Kits are available in both fastener and spot welding applications for customers who build their welders.

For fastener welding applications, we can configure a complete solution when you provide fastener and material information. A complete solution can include upper electrode position and lower VeriFast™ LVDT nut detection monitoring with various control options. Our configured solutions are supplied assembled with drawings and bill of material for easy integration.

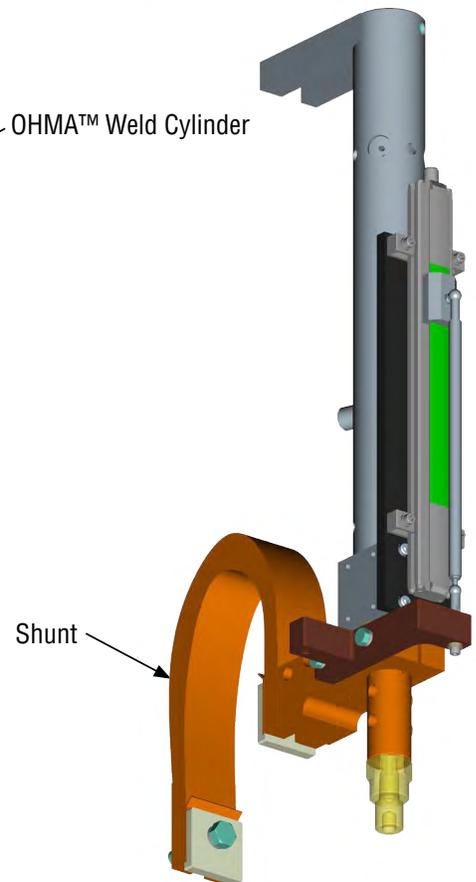


Nut Welding

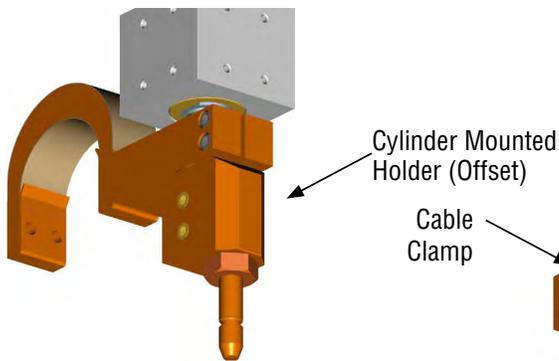
Spot Welding



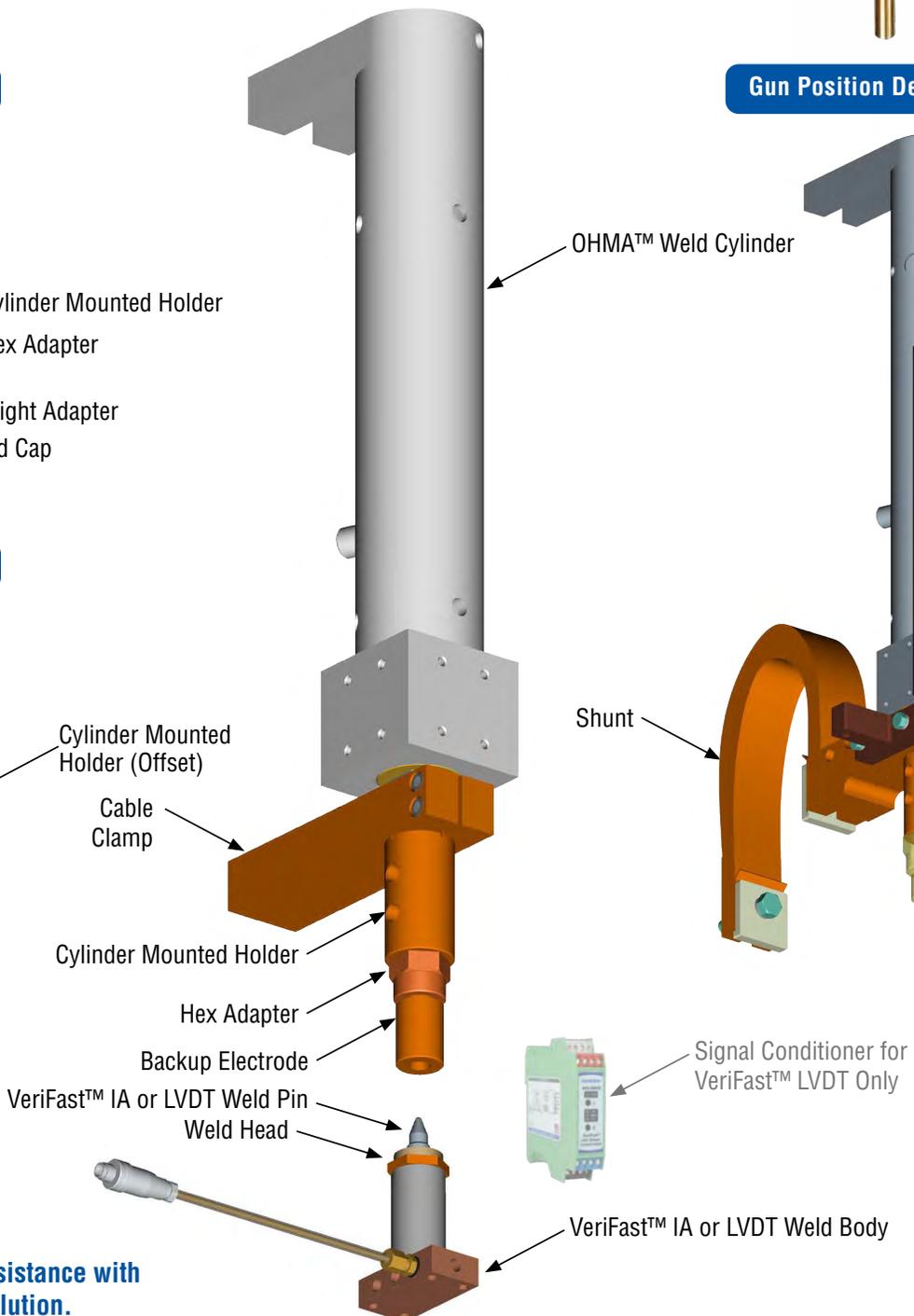
Gun Position Detection



Offset Spot Welding



Offset distances may be limited by force requirements.



Contact CenterLine for assistance with configuring a weld gun solution.

Raw Materials



Alloy Rod and Bar Stock

- Machine Plate
- Hexagon Bar
- Rectangular
- Solid Round Rod

Contact us for pricing on alloy, sizes & dimensions.

Special consumable products are available; contact us for your requirements.

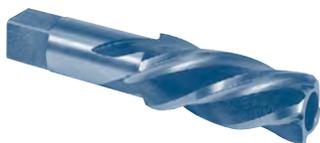
Accessories

Reamers

Worn tapers in electrode holders can be reworked with this high speed steel reamer.

PART NO. DESCRIPTION

R-4E	4RW TAPER .463 TAPER FOR 1/2 ELECTRODE
R-5E	5RW TAPER .625 TAPER FOR 5/8 ELECTRODE
R-6E	6RW TAPER .750 TAPER FOR 3/4 ELECTRODE
R-7E	7RW TAPER .875 TAPER FOR 7/8 ELECTRODE
R-4C	.374 TAPER FOR 1/2 CAP
R-5C	.414 TAPER FOR 5/8 CAP
R-6C	.500 TAPER FOR 3/4 CAP
R-7C	.612 TAPER FOR 7/8 CAP



Nylon Socket Head Insulators

These nylon socket head screw insulators are used on fixtures/machines when the copper needs to be insulated from the rest of the machine.

PART NO. DESCRIPTION

230-008	#10 SCREW
230-009	#10 SCREW
HE-705-57	1/4 SCREW
FSD-15135	5/16 SCREW
FSD-15057	3/8 SCREW
FSD-15058	1/2 SCREW



Male Cap Extractor

To separate CenterLine caps from their adapter shanks the easy way, use the CenterLine Male Cap Extractor. Its beveled edges are radiused to match the shank diameter, increasing wedging action (and eliminating jaw adjustments). Jaw openings contact most of the shank circumference (instead of only two points), resulting in much less damage to the shank and tip.

PART NO. DESCRIPTION

CLEX-45	For 4 and 5 RW Taper Shanks
CLEX-56	For 5 and 6 RW Taper Shanks



Cap Extractor

Use the CenterLine Cap Extractor for removing caps from shanks and die bodies.

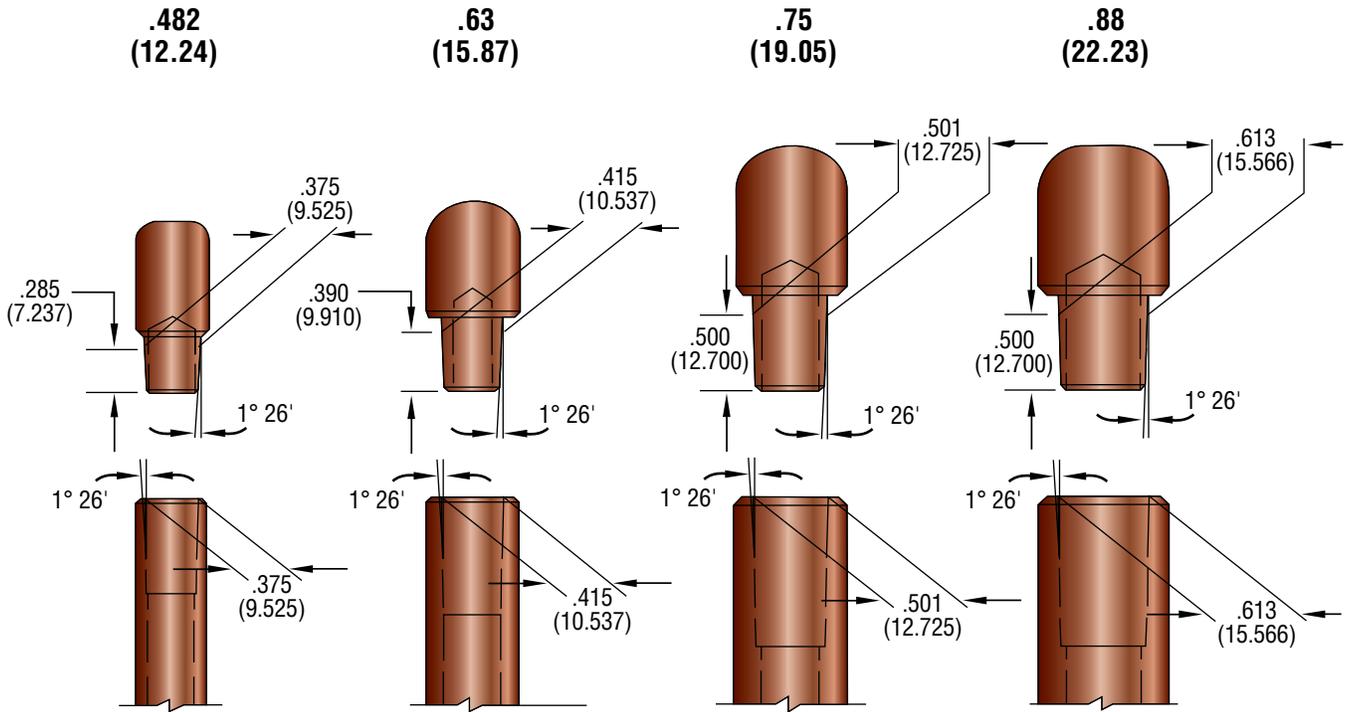
PART NO. DESCRIPTION

CLCX-250	Cap Extractor
----------	---------------

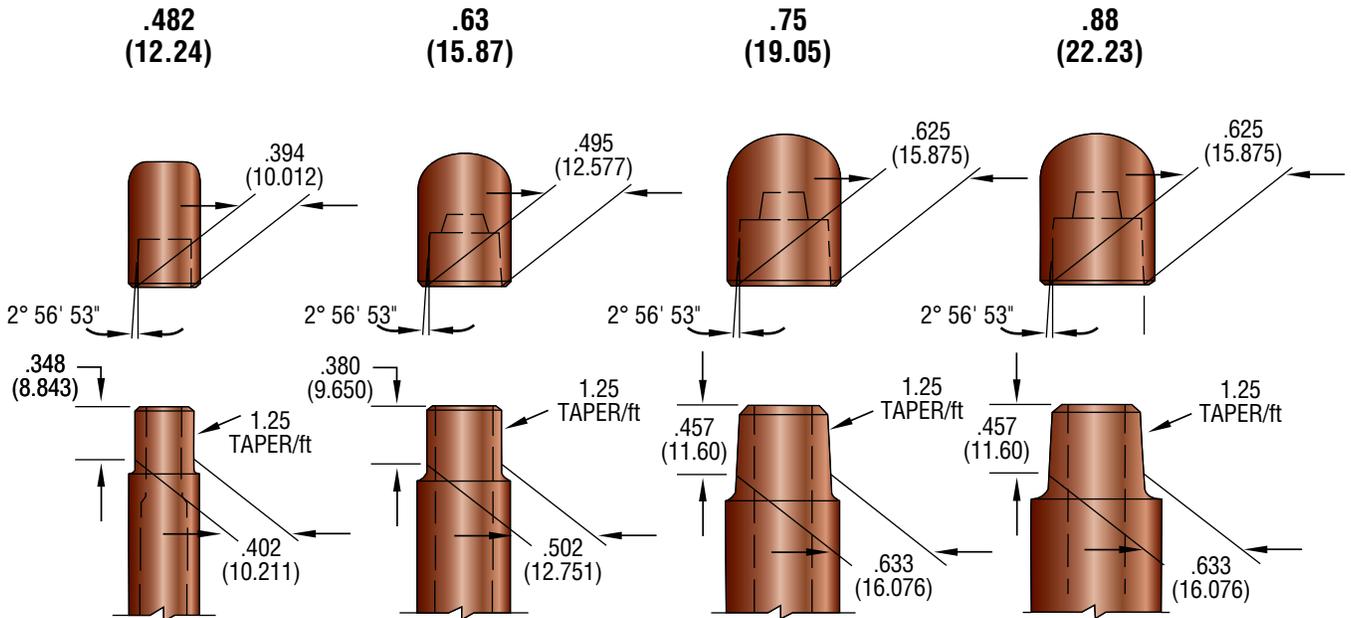


Reference Data

Male Cap Data



Female Cap Data



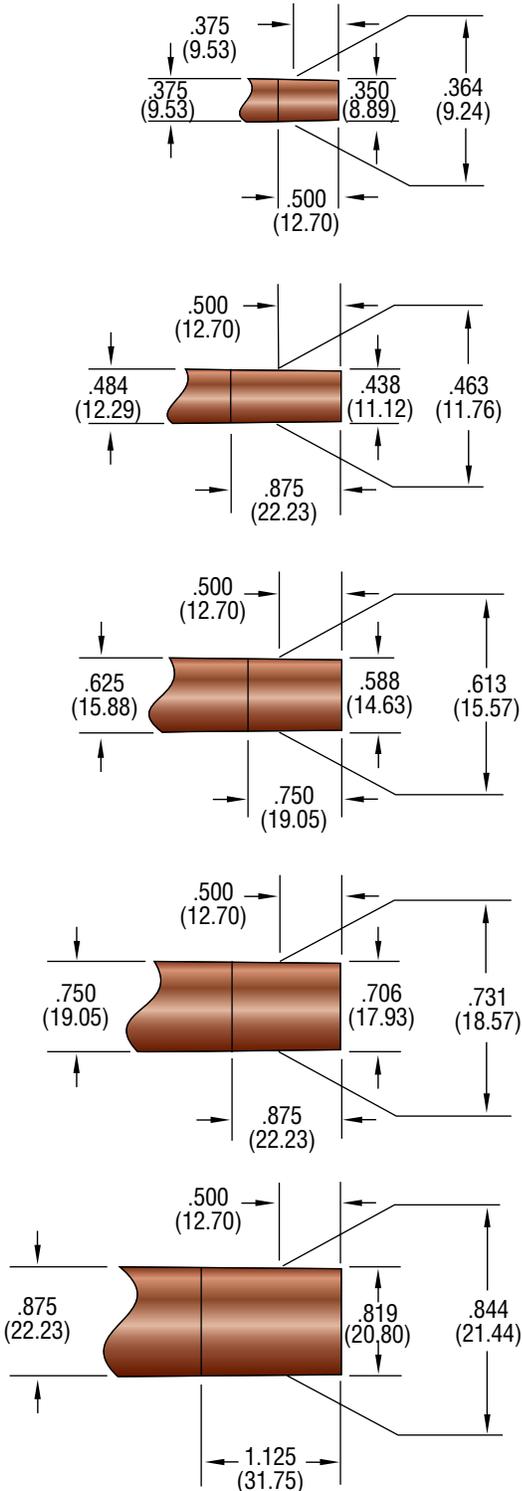
• Dimensions Shown Are: inches (mm).

Reference Data

Straight Female Adapters for Male Caps

ELECTRODE AND ADAPTER TAPERS

CAP TAPERS



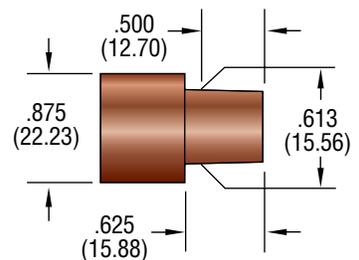
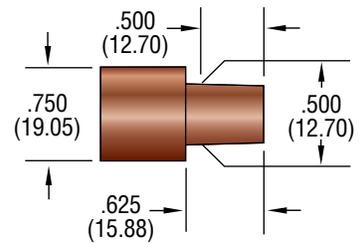
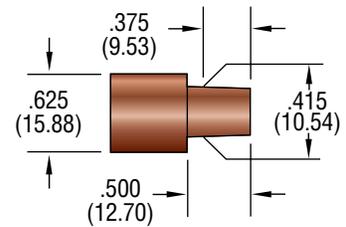
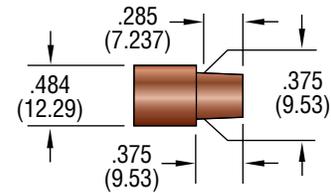
#0 MT - #3 RW

#1 MT - #4 RW

#2 MT - #5 RW

#6 RW

#3 MT - #7 RW



• Dimensions Shown Are: inches (mm).

Reference Data

RWMA Recommended Electrode Materials for Spot Welding

SIMILAR FERROUS METALS

ALLOY 1 **	Stainless Steel		Galvanized Steel		Tin Plate		Terne Plate		Cadmium Plate		Chrome Plate		Cold-Rolled Steel	
	A	2,3*	A	1,2,20	B	1,2,20	A	1,2,20	A	1,2,20	A	2	A	2
ALLOY 1 **	2,3*			1,2,20		1,2,20		1,2,20		1,2,20		2		2

DISSIMILAR NONFERROUS METALS

ALLOY 1 **	Aluminum & Aluminum Alloys		Copper		Nickel-Silver		Nickel & Nickel Alloys		Phosphor Bronze		Yellow Brass		Red Brass	
	A	1	C	13,14	A	2	A	2	A	2	A	2	A	2
ALLOY 1 **	1		13,14		2		2		2		2		2	
ALLOY 1 **	Titanium		Silicon		Bronze		Cupro		Nickel		Magnesium			
	A	2,3	A	2	B	2	A	2	B	2	B	1		
ALLOY 1 **	2,3		2		2		2		2		1			

REFRACTORY METALS

ALLOY 1 → ALLOY 2 ↓	Tungsten Molybdenum		Chrome Plate		Stainless Steel		Nickel & Nickel Alloys	
Tungsten Molybdenum	B	2	B	2	B	2,3*	B	2
	2		2		2		2	

DISSIMILAR FERROUS METALS

ALLOY 1 → ALLOY 2 ↓	Nickel & Nickel Alloy		Cold-Rolled Steel		Tin Plate		Terne Plate		Galvanized Steel		Cadmium Plate		Chrome Plate	
Stainless Steel	B	2	A	2	B	1,2,20	B	1,2,20	B	1,2,20	B	1,2,20	B	2
	2,3*		2,3*		2,3*		2,3*		2,3*		2,3*		2,3*	
Chrome Plate	B	2	B	2	B	1,2,20	B	1,2,20	B	1,2,20	B	1,2,20		
	2		2		2		2		2		2			
Cadmium Plate	B	2	B	2	C	1,2,20	B	1,2,20	B	1,2,20				
	1,2,20		2		1,2,20		1,2,20		1,2,20					
Galvanized Steel	C	2	B	2	B	1,2,20	C	1,2,20						
	1,2,20		1,2,20		1,2,20		1,2,20							
Terne Plate	C	2	B	2	C	1,2,20								
	1,2,20		1,2,20		1,2,20									
Tin Plate	C	2	B	2										
	1,2,20		1,2,20											
Cold-Rolled Plate	C	2												
	2													

DISSIMILAR NONFERROUS METALS

ALLOY 1 → ALLOY 2 ↓	Nickel & Nickel Alloy		Phosphor Bronze		Silicon Bronze		Nickel-Silver		Cupro Nickel		Yellow Brass		Red Brass	
Copper			C	2	C	1,2,20	C	1,2,20	C	1,2,20	C	1,2,20	C	2
			14		14		14		14		14		14	
Red Brass	C	2	C	2	C	2	C	2	C	2	C	2		
	14		14		14		14		14		2			
Yellow Brass	C	2,10*	B	2	B	2	B	2	B	2				
	2		11		11		11		11					
Cupro Nickel	B	2	B	2	B	2	B	2						
	2		2		2		2							
Nickel-Silver	B	2,10*	B	2	B	2								
	1,2,20		1,2,20		1,2,20									
Silicon Bronze	C	2,10*	B	2										
	2		2											
Phosphor Bronze	C	2												
	2													

BLOCK INTERPRETATION	
WELDABILITY A=Excellent, B=Good, C=Fair	ELECTRODE CONTACTING ALLOY 1
ELECTRODE CONTACTING ALLOY 2	

* Electrode materials are second choices
 ** Alloy 1=Alloy 2 (refer to block interpretation)

- ALLOYS**
 1=Class 1 10=Class 10 14=Class 14
 2=Class 2 11=Class 11 20=Class 20
 3=Class 3 13=Class 13

Reference Data

GROUP A – COPPER BASE ALLOYS									
CLASS	RWMA NO.	GENERAL USE	DESCRIPTION	AVAILABILITY*					
				1	2	3	4	5	6
RWMA CLASS 1									
ZIRCONIUM	1.15000	Electrodes for welding aluminum alloys, magnesium alloys, coated materials, brass, and bronzes. It can be used for both spot and seam welding.	A specially heat-treated zirconium copper alloy that meets the minimum electrical conductivity and hardness specification of Class 1 Alloy.		x	x			
CADMIUM	1.16200		A high conductivity cadmium copper alloy, not heat-treatable, but can be work hardened.		x	x			
RWMA CLASS 2									
CHROMIUM- ZIRCONIUM	2.18150	These materials are stronger than Class 1 material but have slightly lower conductivity. They are used for the spot and seam welding of cold and hot rolled steel, stainless steel, and low conductivity brass & bronze. They are also used as flash welding dies and as electrodes to weld steel & other coated materials.	A specially heat-treated chromium zirconium copper alloy that meets the minimum electrical and hardness specification of Class 2 Alloys.	x	x	x			
CHROMIUM	2.18200		A high conductivity chromium copper alloy that obtains its optimum properties from a combination of both heat treatment and cold work.	x	x	x	x	x	
RWMA CLASS 3									
COBALT-BERYLLIUM COPPER	3.17500	Their high hardness makes them ideal for electrodes for the spot and seam welding of high resistance materials such as stainless steel, nichrome and monel metal. As a casting, they are used for flash, butt, and projection welding electrodes & fixtures. They can also be used for seam welder bearing and other current-carrying structural parts.	Heat treatable copper alloys with a combination of high tensile strength and good electrical and thermal conductivity.	x	x	x	x	x	
NICKEL-BERYLLIUM COPPER	3.17500			x	x	x	x	x	
BERYLLIUM-FREE COPPER	3.18000			x	x	x	x		
RWMA CLASS 4									
BERYLLIUM	4.17200	Electrode material for special flash, flash butt and projection welding applications where pressures are extremely high, and wear is severe but where heat is not excessive. Used in the form of inserts & facings.	A heat treatable copper alloy having the unusual combination of very high strength and lower electrical conductivity than Class 3. Can be annealed, machined & reheat treated to regain its properties.	x	x	x	x	x	
RWMA CLASS 5									
ALUMINUM	5.95300	Typical uses are flash welding electrodes, secondary circuit welder arms, knees, platens and other current carrying fixtures where high strength, wear-resistance and non-magnetic properties are required.	Copper base alloy usually furnished in the form of castings. It is not heat treatable.	x					
<p>*AVAILABILITY CODING EXPLANATION</p> <ul style="list-style-type: none"> • 1 = CASTING • 2 = FORGING • 3 = ROD & BAR • 4 = PLATE • 5 = TUBE • 6 = INSERTS <p>• GENERAL SUGGESTED APPLICATIONS, NOT TO BE INTERPRETED AS THE OPTIMUM FOR ANY SPECIFIC APPLICATION</p>									
Continued on next page.									

Reference Data

GROUP B – REFRACTORY METAL COMPOSITION										
CLASS	RWMA NO.	GENERAL USE	DESCRIPTION	AVAILABILITY*						
				1	2	3	4	5	6	
RWMA CLASS 10										
COPPER-TUNGSTEN	10.7445	Flash and butt welding electrodes where higher electrical and thermal conductivity is necessary and where a degree of malleability is desired. They can also be used for spot welding low conductivity steels -- stainless.	A powder metallurgical combination of 45% copper & 55% of the refractory metal tungsten. Not a true alloy. This combination produces dense, hard metals of superior wear resistance and strength at elevated temperatures.			x				x
RWMA CLASS 11										
COPPER-TUNGSTEN	11.744	Projection welding electrodes, flash & butt welding electrodes, light upsetting electroforming & seam welder bushings. Harder than Class 10 & used where moderate pressure required.	A powder metallurgical combination of 25% copper and 75% of the refractory metal tungsten. Not a true alloy. This combination produces dense, hard metals with good thermal & electrical conductivity.				x			x
RWMA CLASS 12										
COPPER-TUNGSTEN	12.7435	Heavy-duty projection welding electrodes electro-forming & electroforming electrodes, electrode facing for upsetting of studs and rivets, cross wire welding of large diameter wire and rod.	A powder metallurgical combination of 20% copper and 80% of the refractory metal tungsten. Not a true alloy. This combination produces dense, hard metals of superior wear resistance and strength at elevated temperatures.			x				x
RWMA CLASS 13										
TUNGSTEN	13.74300	Cross wire welding of copper & brass electro brazing and some electro upsetting. Welding of braided copper wire to other materials.	Tungsten is extremely hard and has low ductility. It cannot be machined but can be ground to required contours. It does not alloy with non-ferrous materials.			x	x			x
RWMA CLASS 14										
MOLYBDENUM	14.42300	Cross wire welding of copper & brass electro brazing and some electro upsetting. Welding of braided copper wire to other materials.	Molybdenum is not as hard as Class 13 and can be drilled and machined to special contours.			x	x	x		x
GROUP C – SPECIALTY MATERIAL										
RWMA CLASS 20 Glidcop® AL-60										
DISPERSION STRENGTHENED COPPER	20.15760	Welding of metallic coated metal such as galvanized steel, tern plate, etc.	A powder metallurgy material consisting of copper and aluminum oxide with high temperature hardness and physical properties different than the copper alloys.		x	x				
<p>*AVAILABILITY CODING EXPLANATION</p> <ul style="list-style-type: none"> • 1 = CASTING • 2 = FORGING • 3 = ROD & BAR • 4 = PLATE • 5 = TUBE • 6 = INSERTS <p>• GENERAL SUGGESTED APPLICATIONS, NOT TO BE INTERPRETED AS THE OPTIMUM FOR ANY SPECIFIC APPLICATION</p>										

Reference Data

OVEREXPOSURE EFFECTS						
TYPE/LOCATION OF OVEREXPOSURE	RWMA CLASS 1	RWMA CLASS 2	RWMA CLASS 3	ZIRCONIUM	TUNGSTEN	GLIDCOP
Skin: Irritation with possible discoloration of the skin or hair.	X	X		X	X	N/A
Skin: Irritation with possible discoloration of skin (Copper). On broken skin, can cause granulomatous lesions (hard with a central non-healing core) (Beryllium). Cobalt can cause allergic sensitivity even with very low exposures. Often expressed as eruptions in creases of elbow, knee, ankles, and neck.			X			
Inhalation: Upper respiratory tract irritation, metallic taste in the mouth, nausea, metal fume fever (sensation of chills and stuffiness of the head and weakness). Possible lesions on nasal passages.	X	X		X	X	N/A
Inhalation: Upper respiratory tract irritation, metallic taste in the mouth, nausea, metal fume fever (sensation of chills and stuffiness of the head and weakness). Possible lesions on nasal passages (Copper). Cough, substernal pain, moderate shortness of breath, some weight loss (Beryllium). Chronic Beryllium disease can be from non-disabling to severely disabling. High Cobalt inhalation levels can cause asthma-like symptoms to interstitial pneumonia with fibrosis in severe cases.			X			
Eyes: Metal particles penetrating the eyes may cause irritation, discoloration and damage.	X	X		X	X	X
Eyes: Copper particles penetrating the eye may cause irritation, discoloration, and damage. Beryllium dust and fumes may cause irritation and conjunctivitis.			X			
Cadmium: Reported to increase incidence of prostate cancer.		X				
Beryllium & Nickel: Classed as suspect of carcinogenic potential for man.			X			
Chromium: Dust, and fumes can cause skin and pulmonary sensitization and is corrosive. Overexposure is unlikely to occur.		X				
REACTIVITY						
Hazardous Polymerization: Will not occur. Stability: Stable Incompatibility: Dust or fume contact/acetylene gas may cause formation of copper acetylenes which are sensitive to shock.	X	X	X	X		X
Hazardous Decomposition Products: Melting may generate harmful fumes.					X	
EMERGENCY & FIRST AID PROCEDURES	Skin: Wash contaminated skin using soap or mild detergent and water. If irritation persists after washing, get medical attention. Eyes: Wash eyes immediately with large amounts of water, lifting lower and upper lids occasionally. Get medical attention immediately.					

Limited Warranty

Contract Terms and Conditions Applicable to All Sales

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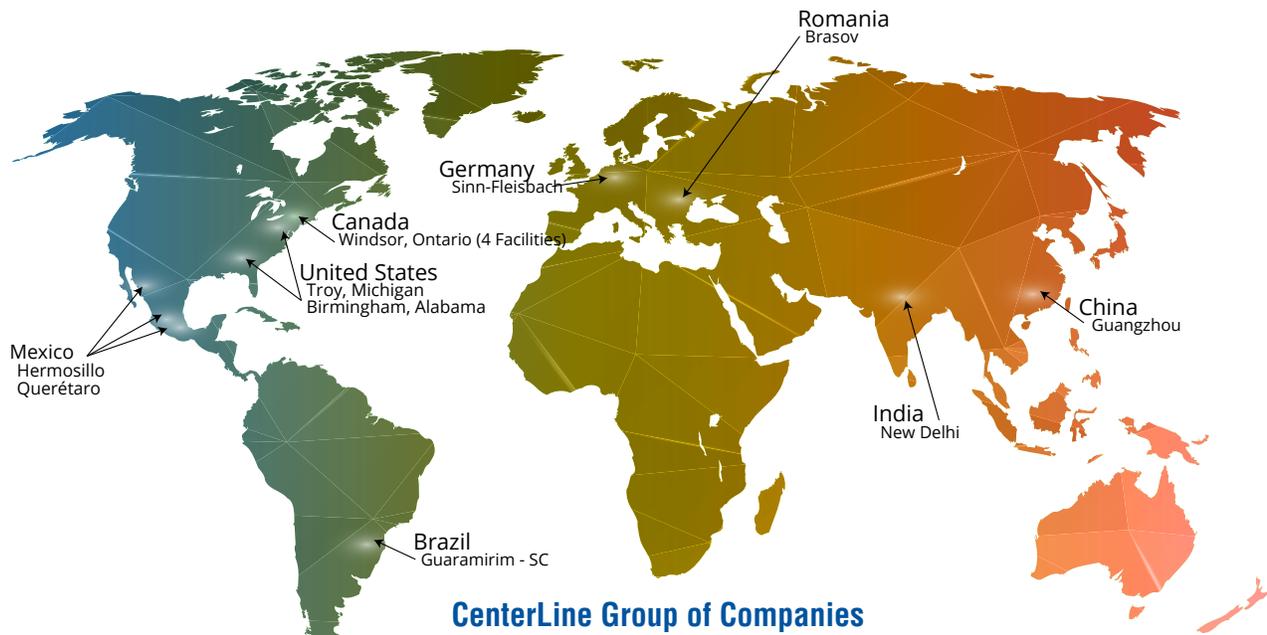
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Global Organization



CenterLine Group of Companies

Name	Location	Products	Facility Size Sq. Ft. (m ²)
CenterLine Machinery Division	Windsor, Ontario, Canada	Custom automated assembly systems and related machinery integration components- (resistance, GMAW & laser welding, metal forming).	219,000 (20,345)
CenterLine Mechatronics Division		Brand Products for welding automation, resistance welding, fastener welding & metal forming.	85,000 (7,900)
CenterLine Electrodes Division		Standard and custom electrodes, caps, nut & stud welding systems and related welding consumable products.	35,000 (3,250)
CenterLine Automation Components Division		Resistance welding guns, actuators, metalworking press and cylinder packages, nut detection systems.	54,000 (5,016)
CenterLine Supersonic Spray Technologies		Cold Spray metal coating equipment, and supplies.	4,000 (370)
CenterLine de México S. de R.L. de C.V.	Querétaro, Qro Mexico	Stationary welders, small automation cells, consumable electrodes, tooling, and fixtures.	25,400 (2,360)
CenterLine Germany GmbH	Sinn-Fleisbach, Germany	Stationary welders, welding guns, small automation cells, and actuators.	16,000 (1,480)
CenterLine Brasil Solda e Automação Ltda	Guaramirim, SC Brazil	Stationary welders, small automation cells, consumable electrodes, tooling, and fixtures.	18,500 (1,720)
CenterLine India Pvt Ltd	New Delhi, India	Spare parts, stationary welding machines, and electrode consumables.	8,800 (820)
CenterLine Welding Technologies (Guangzhou) Co., Ltd	Guangzhou, China	Welding guns and spare parts.	6,500 (604)

Sales, Service & Engineering Support Facilities

CenterLine Welding Products	Troy, MI USA	US sales office for CenterLine products and services; commodity management.
CenterLine SE USA Office	Birmingham, AL	Southern US sales and service office for CenterLine standard products.
CenterLine (Romania) Limited	Brasov, Romania	Engineering support center.
CenterLine De Mexico	Hermosillo, Mexico	Western Mexico sales office for CenterLine products and services; commodity management.



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