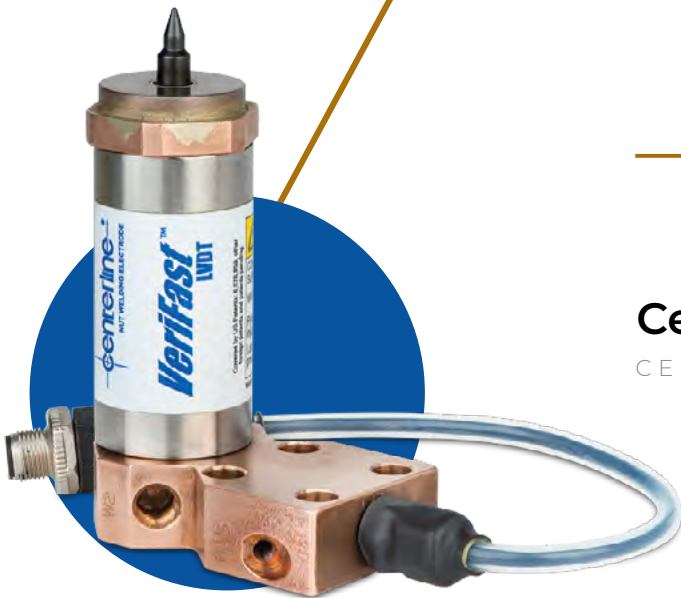


Electrodes Catalogue

Ver. 9.01



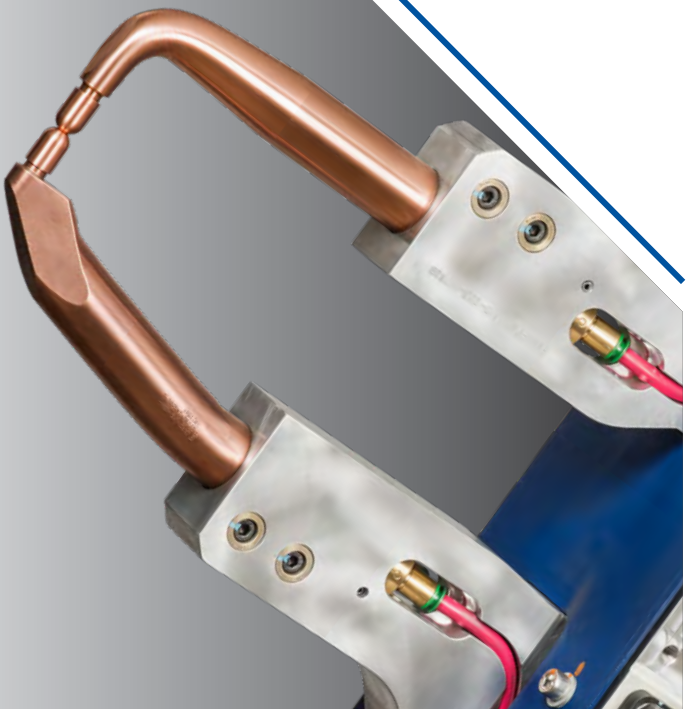
CenterLine (Windsor) Limited

CENTERED ON SOLUTIONS



CenterLine's Electrodes Division manufactures and supplies a complete range of consumable welding products. These include cold-formed electrodes, welding tips, fixtures, adapters, holders, seam welding wheels, patented weld nut electrodes, special welding dies, shunts and cables, and a host of accessory products. 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.

TABLE OF CONTENTS




VeriFast™ LVDT Weld Bodies Overview.....	4
VeriFast™ LVDT Weld Body Components	5
Weld Fastener Application with LVDT	6
Weld Bodies VeriFast™ LVDT Quick Reference	10
Weld Bodies VeriFast™ LVDT - Base Mount.....	12
Weld Bodies VeriFast™ LVDT - Tapered & Threaded.....	15
Weld Bodies VeriFast™ LVDT - SYVR.....	16
Weld Bodies VeriFast™ LVDT - SXZR.....	17
Weld Bodies VeriFast™ LVDT - Clamp Mount.....	18
Weld Pins	19
VeriFast™ LVDT Nut Weld Pin.....	20
VeriFast™ LVDT Tapped Nut Weld Pin.....	21
VeriFast™ LVDT Stud Weld Pin	22
Weld Head - GH Style	24
Weld Head - PH Style.....	25
Stud Weld Head - GH Style	26
VeriFast™ Stud Weld Pin	27
Backup Electrodes BE (RWMA Taper).....	28
Backup Electrodes BE (ISO Taper).....	29
HE Hex Electrodes.....	30
RBE Block Electrodes	31
Non-Detection Weld Body Components.....	32
Non-Detection Weld Bodies	33
Spot Welding Caps - Female	35
Spot Welding Caps - Male	40
Straight Male Adapters for Female Caps	42
Straight Female Adapters for Male Caps	43
Offset Male Adapters for Female Caps	44
Offset Female Adapters for Male Caps	45
Straight Thread Hex Adapters.....	46
Cap and Electrode Hex Adapters Pipe Thread.....	47
Quick Change Electrodes	48
Replaceable Button Caps.....	49
Button Caps	50
Swivel Head Electrodes with Water-Cooled Shanks	51
Platen Mount Holders	52
Cylinder Mounted Holders	53
Heavy Duty Cylinder Mounted Holders	55
Light Duty Cylinder Mounted Holders.....	56
Light Duty Shunt/Cable Clamps	57
Heavy Duty Shunt/Cable Clamps.....	57
Air-Cooled Jumper Cables.....	58
Laminated Shunts.....	59
Water Tubes	60
CLWG Straight Acting Integration Kit.....	61
Raw Materials.....	62
Accessories	62
Reference Data.....	63
Limited Warranty	69
Global Organization.....	70
Corporate Product Overview.....	71

VeriFast™ LVDT Weld Bodies Overview


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

- 4




BE Electrode

Pages 28-29
- 3



Weld Head

Pages 24-26
- 2




VeriFast LVDT Nut Weld Pin

Includes *Connecting Rod Assembly* and *Pin Lock* that can be reused multiple times with Consumable Pins.

Pages 19-22

+




LVDT Connecting Rod Assembly

Pin Lock


Hex Tool

Kit supplied with all base mount bodies. Provided that the *Connecting Rod Assembly* and *Pin Lock* are in good condition, they can be reused multiple times with new VeriFast LVDT **Nut Weld Pins**.
- 1



VeriFast LVDT Weld Body

Pages 12-18
- 5

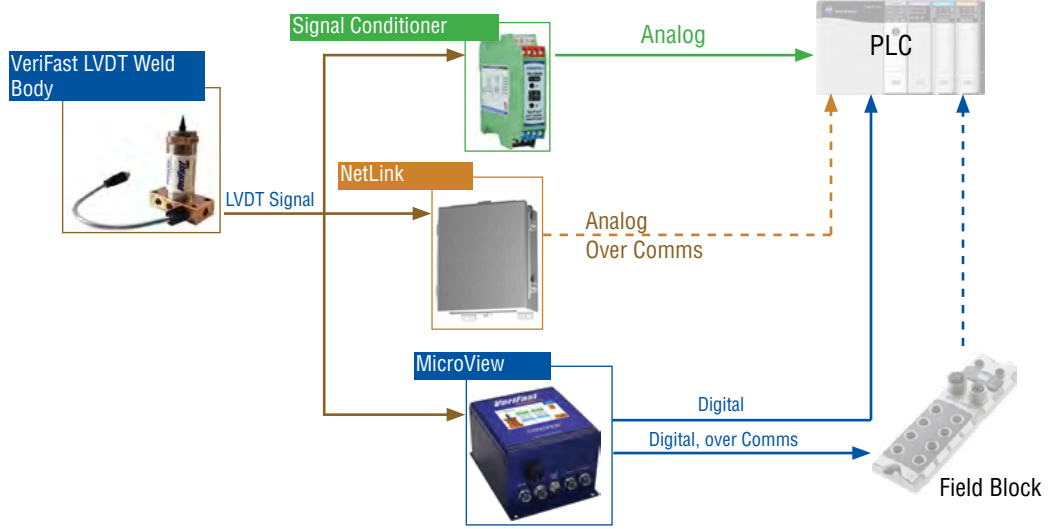


LVDT Signal Conditioner

Required for VeriFast LVDT Weld Bodies.

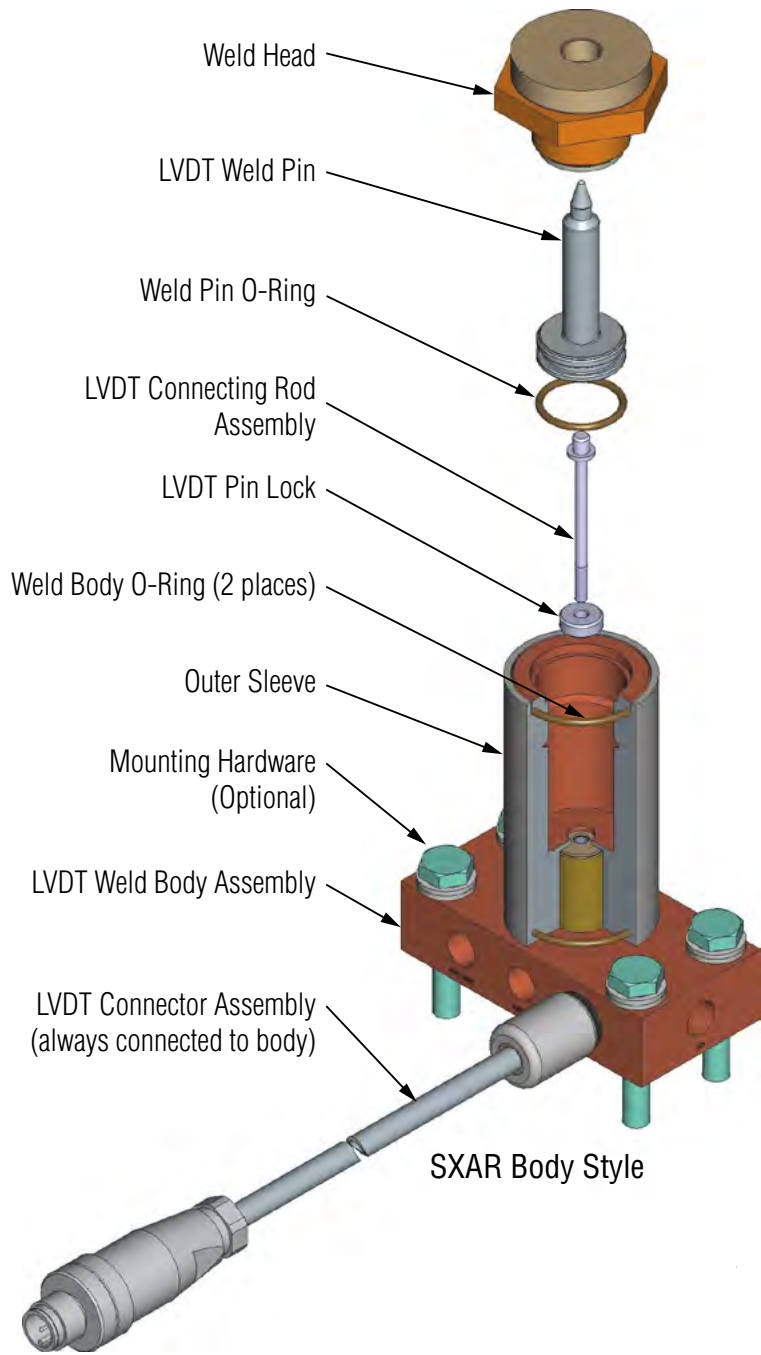
Part #: 606-67546

System Overview



For additional information, see the VeriFast LVDT product page on the CenterLine website: www.cntrline.com

VeriFast™ LVDT Weld Body Components



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.

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-017



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



Nut Weld Contact
 CL-200-37

Weld Fastener Application with LVDT

Please email completed form to: info@cntrline.com
 Fillable form is also available on the CenterLine website.

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

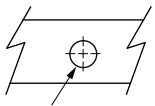

1.3. Fastener drawings must be provided with this application, as well as:

Fastener Part Number:	
Manufacturer:	

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

1.5. Stamping Details:

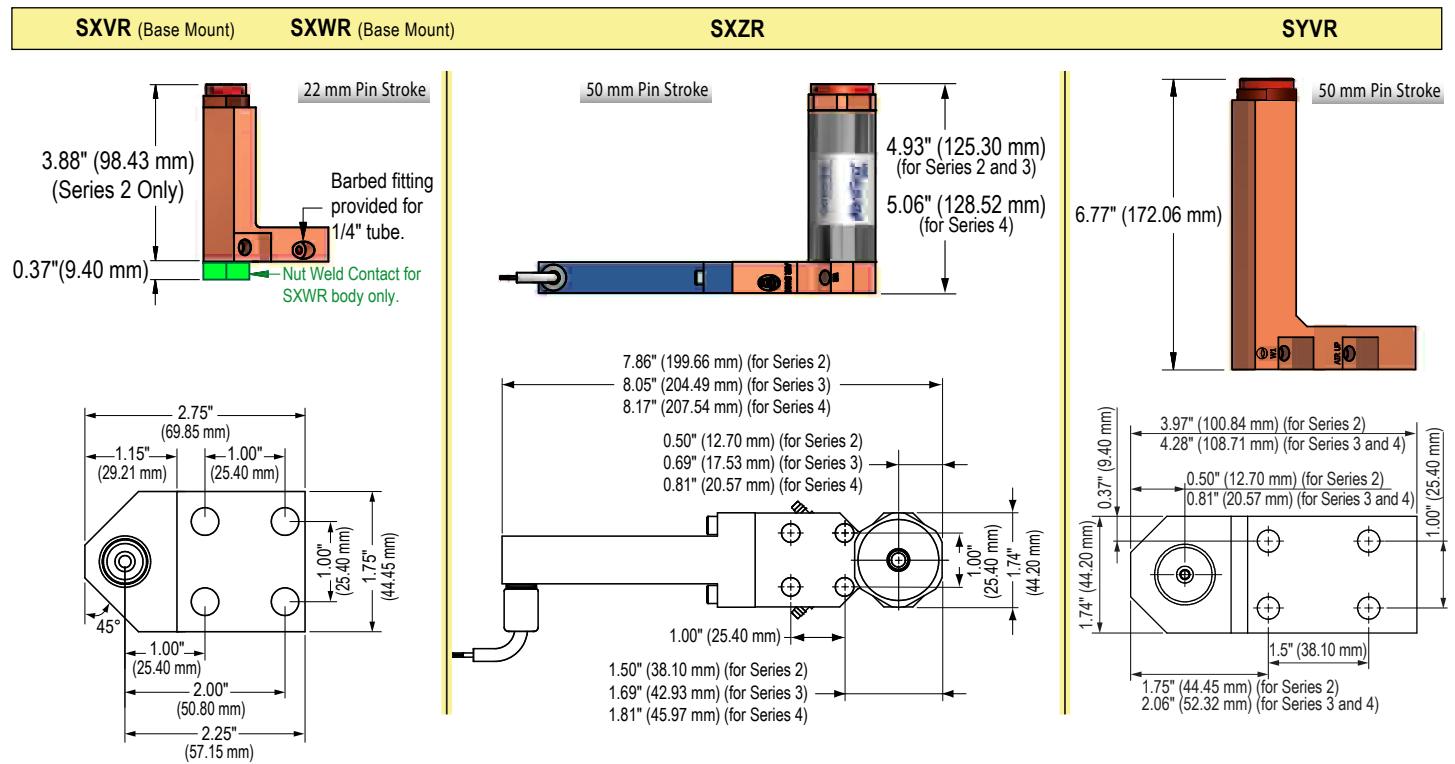
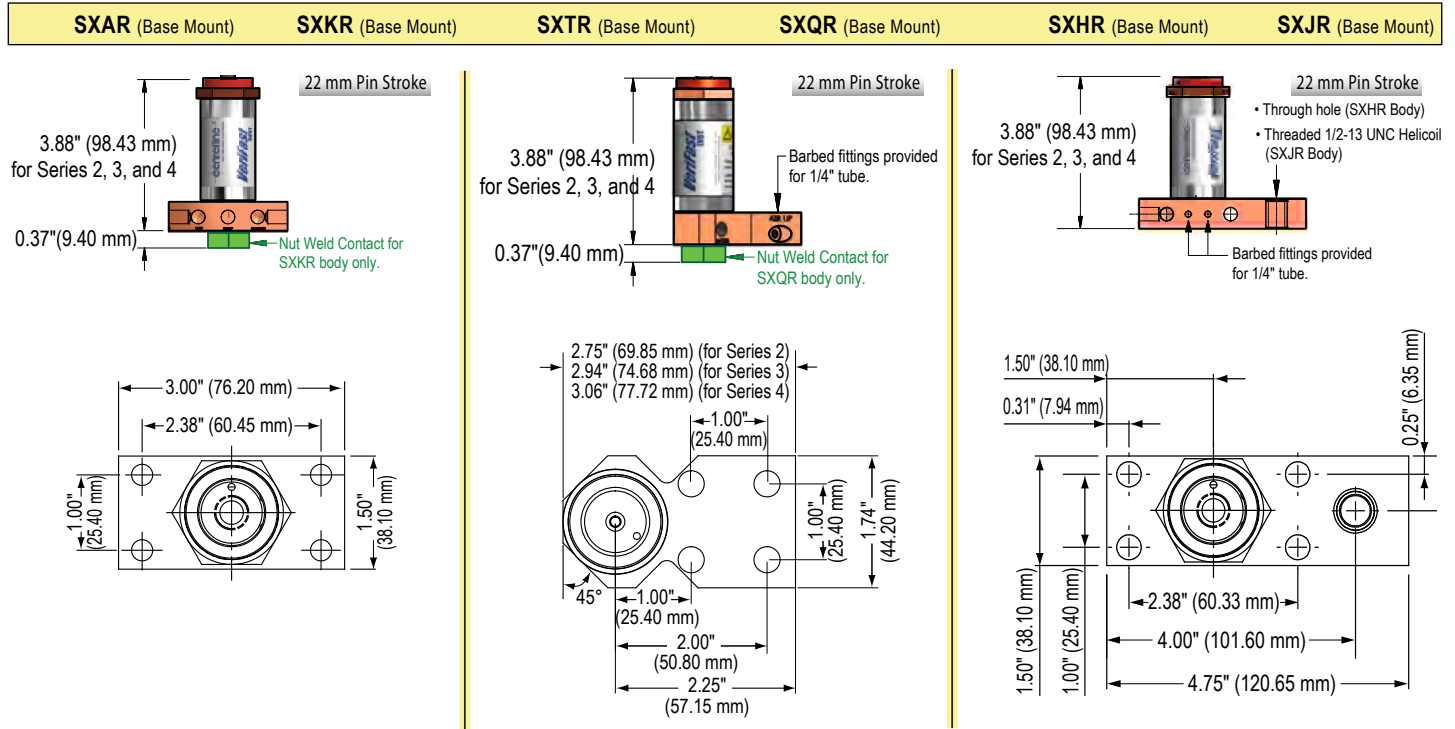
(Enter the corresponding dimensions below):

 Min. Hole Diameter In Stamping	 Stamping Thickness

Weld Fastener Application with LVDT

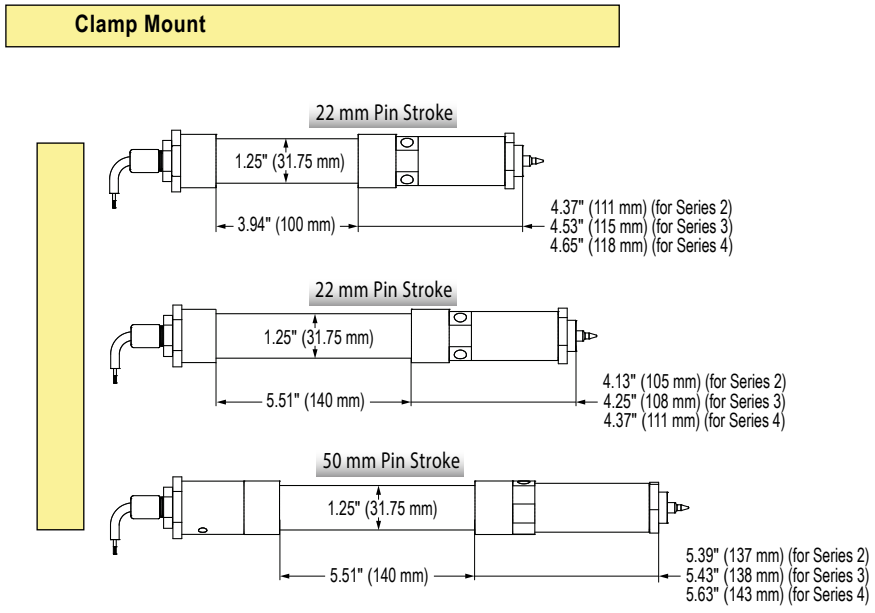
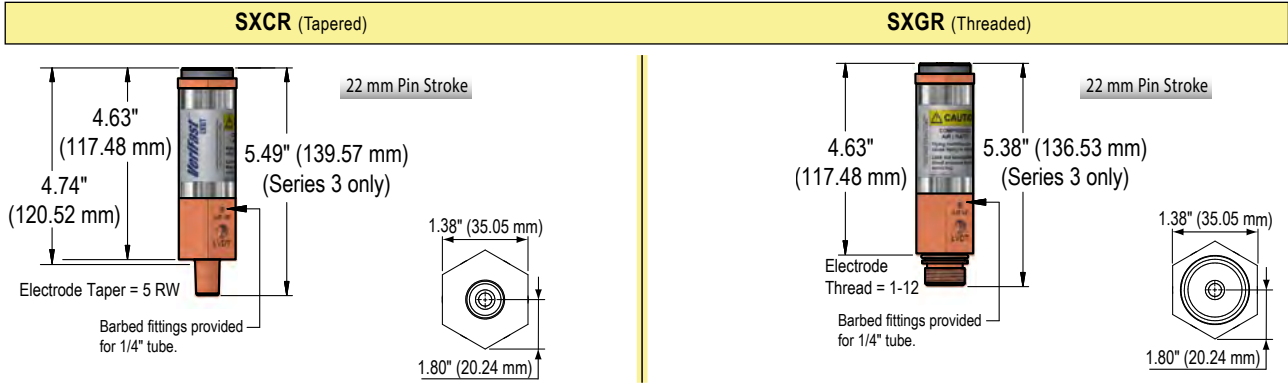
2. LVDT Weld Body Information

2.1. Body Style:



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

Weld Fastener Application with LVDT



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

Weld Fastener Application with LVDT

2.2. Cable Exit Position:

For body style SXAR, SXHR, SXJR Top Left Top Right (Preferred)	For body style SXKR, SXTR, SXQR, SXVR, SXWR, SXZR, SYVR Top Middle	For body style SXCR, 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).
-----------	----------	---

2.4. Attachment Screws *,**:

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

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

3. LVDT 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, which are Series 2 only. Tapered (SXCR) and Threaded (SXGR) Weld Bodies are Series 3 only. IMPORTANT: The Series number must be consistent between all components of the LVDT Smart Electrode (Body, Pin, and Head).
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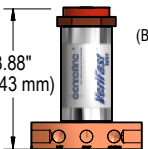
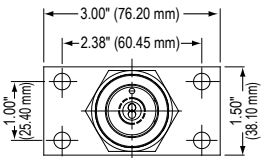
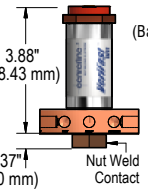
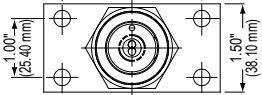
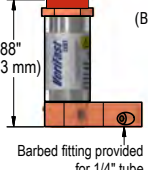
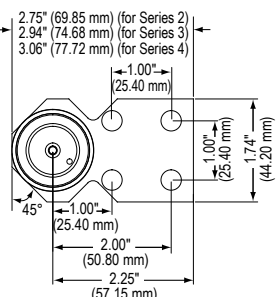
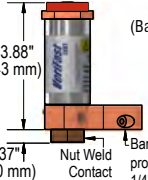
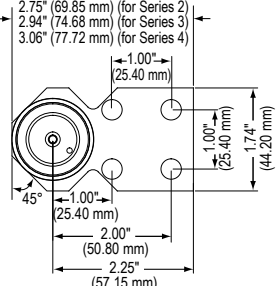
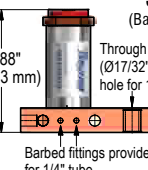
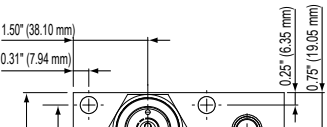
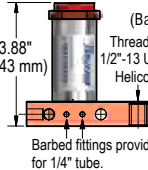
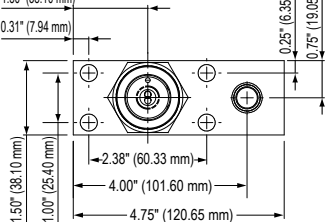
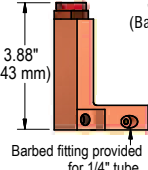
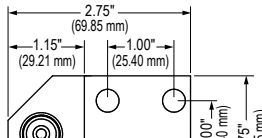
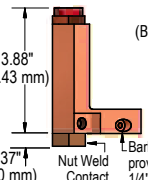
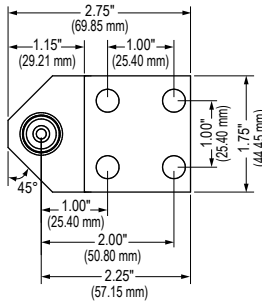
4. LVDT Weld Pin Information

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
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5. Comments:

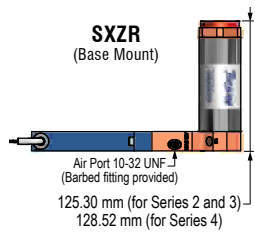
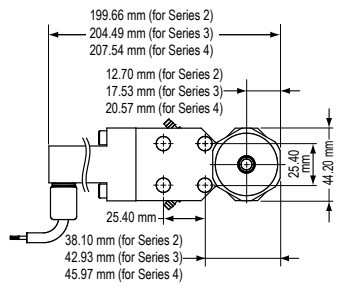
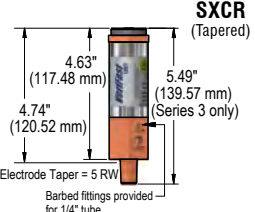
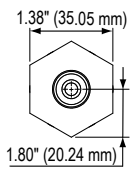
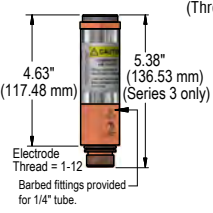
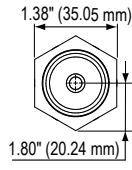

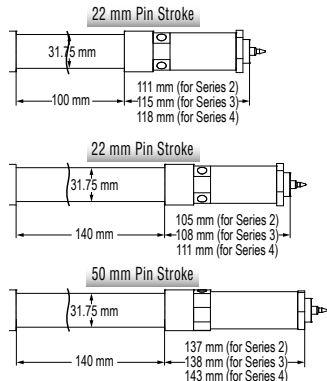
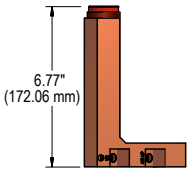
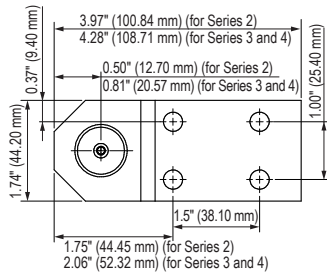
Please email completed form to: info@cntrline.com

Weld Bodies VeriFast™ LVDT 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				
1	 SXAR (Base Mount) 3.88" (98.43 mm)	X	✓	✓	✓	✓	X	✓	✓	X	X	✓	✓	DG Style LVDT Connecting Pin Lock Rod Assembly	
2	 SXKR (Base Mount) 3.88" (98.43 mm) 0.37" (9.40 mm) Nut Weld Contact	✓	✓	✓	✓	✓	X	X	X	✓	X	✓	✓	DG Style LVDT Connecting Pin Lock Rod Assembly	
3	 SXTR (Base Mount) 3.88" (98.43 mm) Barbed fitting provided for 1/4" tube.	X	✓	✓	✓	✓	X	X	X	✓	X	✓	✓	DG Style LVDT Connecting Pin Lock Rod Assembly	
4	 SXQR (Base Mount) 3.88" (98.43 mm) 0.37" (9.40 mm) Nut Weld Contact Barbed fitting provided for 1/4" tube.	✓	✓	✓	✓	✓	X	X	X	✓	X	✓	✓	DG Style LVDT Connecting Pin Lock Rod Assembly	
5	 SXHR (Base Mount) 3.88" (98.43 mm) Through hole (Ø17/32" clearance hole for 1/2" screw) Barbed fittings provided for 1/4" tube.	✓	✓	✓	✓	✓	X	✓	✓	X	X	✓	✓	DG Style LVDT Connecting Pin Lock Rod Assembly	
6	 SXJR (Base Mount) 3.88" (98.43 mm) Threaded 1/2"-13 UNC Helicoil Barbed fittings provided for 1/4" tube.	✓	✓	✓	✓	✓	X	✓	✓	X	X	✓	✓	DG Style LVDT Connecting Pin Lock Rod Assembly	
7	 SXVR (Base Mount) 3.88" (98.43 mm) Barbed fitting provided for 1/4" tube.	X	✓	X	X	✓	X	X	X	✓	X	✓	✓	DG Style LVDT Connecting Pin Lock Rod Assembly	
8	 SXWR (Base Mount) 3.88" (98.43 mm) 0.37" (9.40 mm) Nut Weld Contact Barbed fitting provided for 1/4" tube.	✓	✓	X	X	✓	X	X	X	✓	X	✓	✓	DG Style LVDT Connecting Pin Lock Rod Assembly	

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

Weld Bodies VeriFast™ LVDT Quick Reference

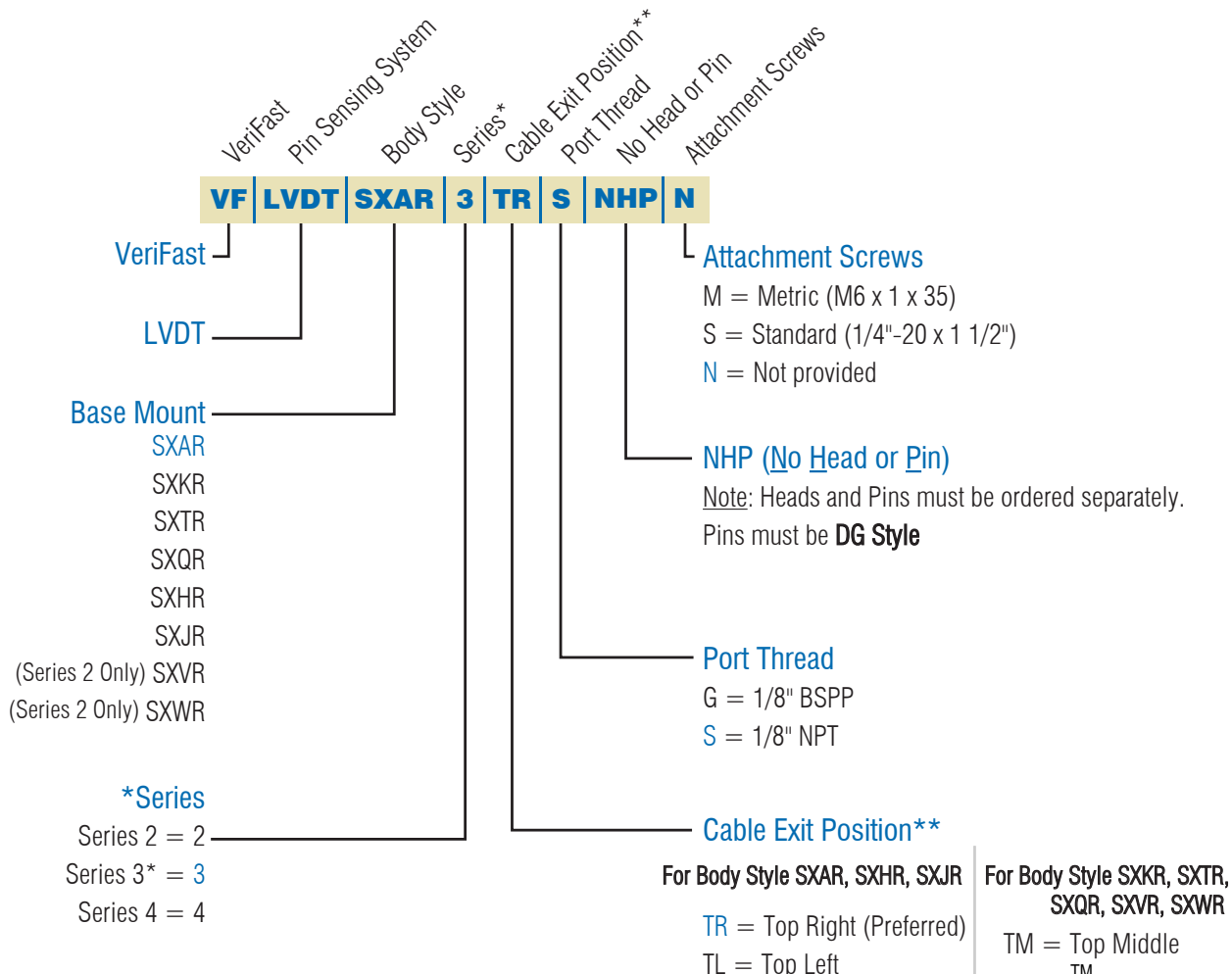
No.	VeriFast LVDT Weld Body Style	Insulated Body	Series					Stroke (mm)				Cable Exit Position				Weld Pin Style	Weld Body Foot Print / Other Details
			2	3	4	22	50	Top Left	Top Right	Top Middle	Pre-Defined						
9	<p>SXZR (Base Mount)</p> 	X	✓	✓	✓	X	✓	X	X	✓	X	X	✓	X			
10	<p>SXCR (Tapered)</p> 	X	X	✓	X	✓	X	X	X	X	X	X	✓				
11	<p>SXGR (Threaded)</p> 	X	X	✓	X	✓	X	X	X	X	X	✓					
12	<p>Clamp Mount</p> 	X	✓	✓	✓	✓	X	X	X	✓							
13	<p>SYVR (Base Mount)</p> 	X	✓	✓	✓	X	✓	X	X	✓	X						

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

Weld Bodies VeriFast™ LVDT - Base Mount



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



* 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).

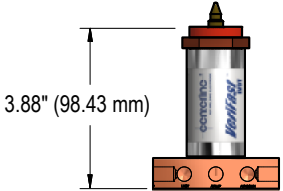
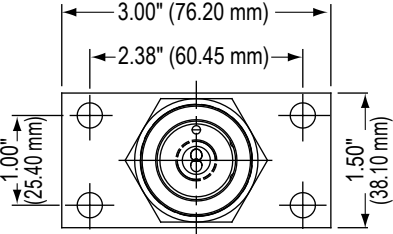
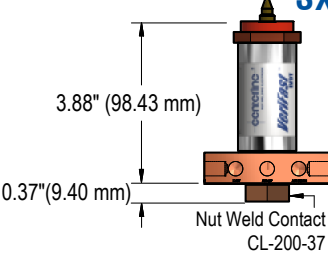
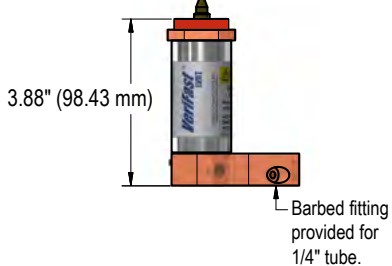
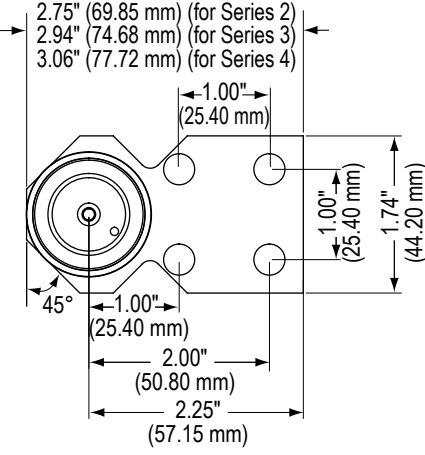
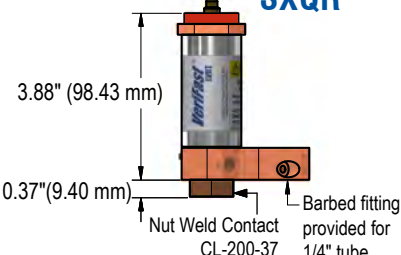
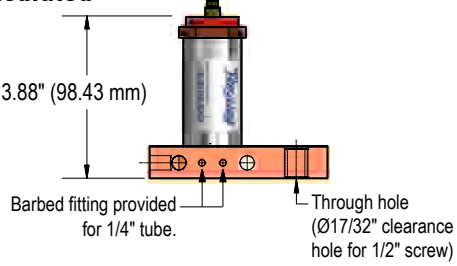
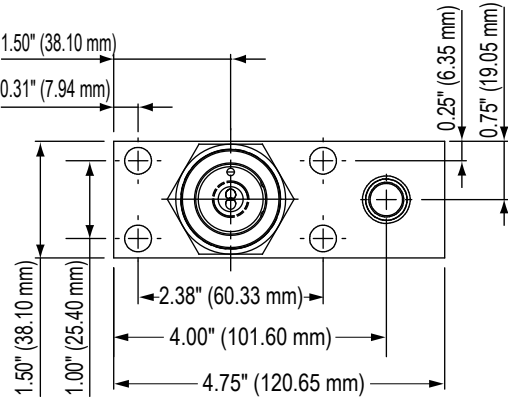
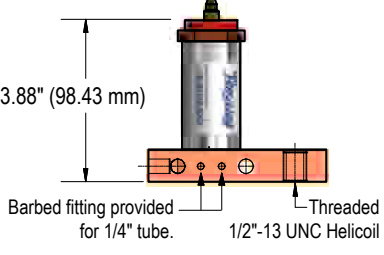
** To connect to the Signal Conditioner, MicroView or NetLink the VeriFast LVDT requires a micro (12 mm), 5-pin, shielded, female tool cord.
IMPORTANT: A Signal Conditioner, MicroView or NetLink is required for each weld body, with the exception of interchangeable tooling.

Weld Bodies VeriFast™ LVDT - Base Mount



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

<p style="text-align: center;">SXAR</p>  <p style="text-align: center;">SXAR and SXKR</p>  <p style="text-align: center;">Insulated SXKR</p> 	<p style="text-align: center;">SXTR</p>  <p style="text-align: center;">SXTR and SXQR</p>  <p style="text-align: center;">Insulated SXQR</p> 	<p style="text-align: center;">Insulated SXHR</p>  <p style="text-align: center;">SXHR and SXJR</p>  <p style="text-align: center;">Insulated SXJR</p> 
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(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.**

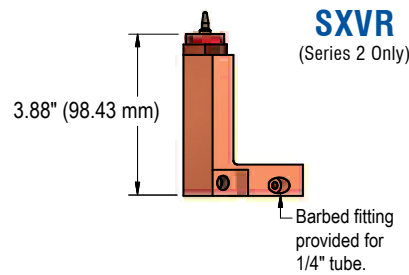
Weld Bodies VeriFast™ LVDT - Base Mount



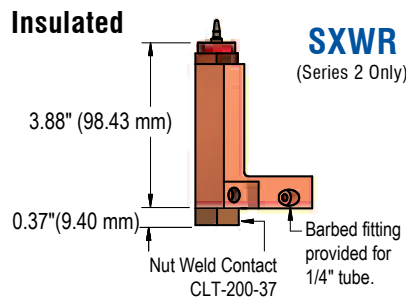
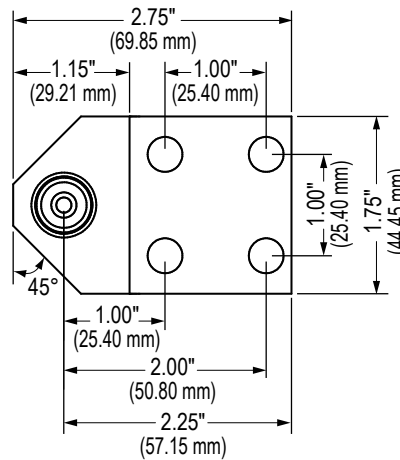
...(Continued from the previous page)

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

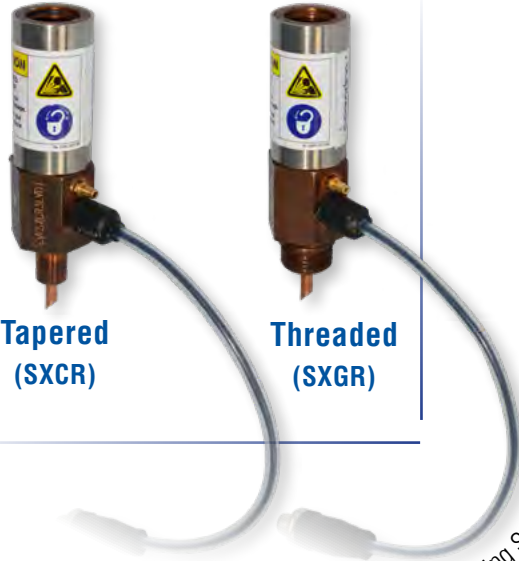


SXVR and SXWR



** 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.

Weld Bodies VeriFast™ LVDT - Tapered & Threaded



**Tapered
(SXCR)**

**Threaded
(SXGR)**

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

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

VF LVDT SXCR 3 XX S NHP N

VeriFast

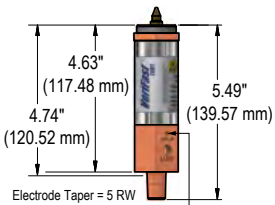
LVDT

Base Mount

Tapered = SXCR

Threaded = SXGR

SXCR
(Series 3 Only)

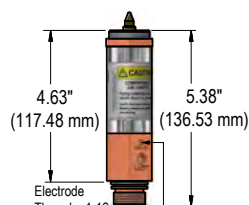


Barbed fitting provided for 1/4" tube.

1.38" (35.05 mm)

1.80" (20.24 mm)

SXGR
(Series 3 Only)



Barbed fitting provided for 1/4" tube.

1.38" (35.05 mm)

1.80" (20.24 mm)

Attachment Screws

N = No option

NHP (No Head or Pin)

Note: Heads and Pins must be ordered separately.
Pins must be DJ Style

Port Thread

S = No option (Barbed fittings provided)

Cable Exit Position**

XX = No option

Series

3 = Series 3

** 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.

LVDT Signal Conditioner

Required for VeriFast LVDT Weld Bodies.
Part #: 606-67546

Weld Bodies VeriFast™ LVDT - SYVR

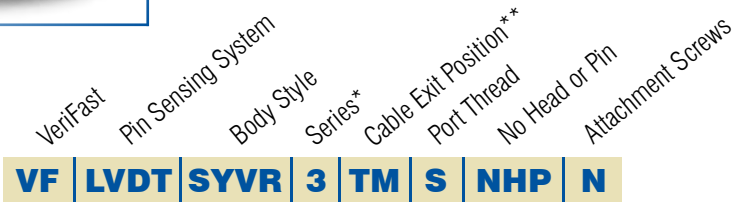
For Stud Welding applications where the stud length is 18-46 mm.



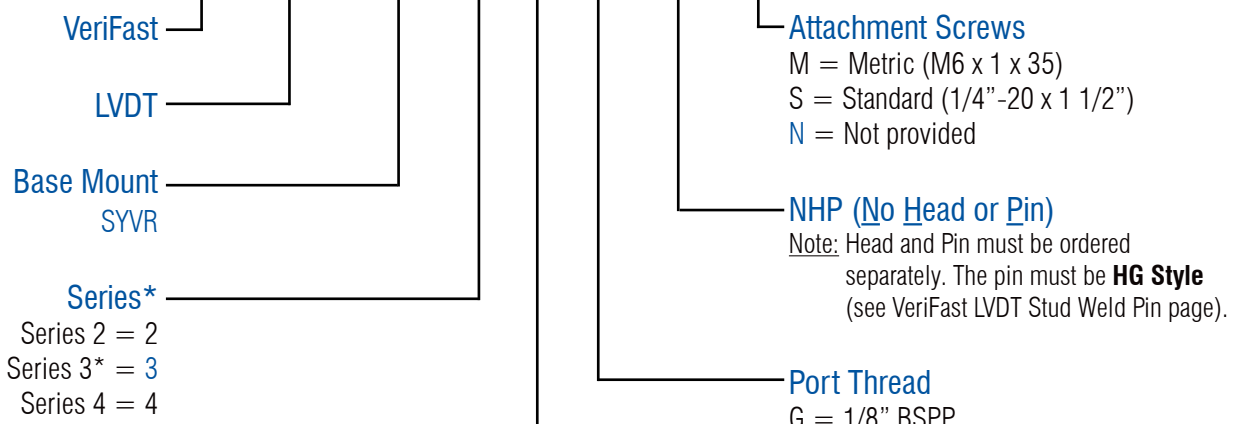
HG Kit for LVDT Weld Pin
(Supplied with all weld bodies)
Part #: 608-59383







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

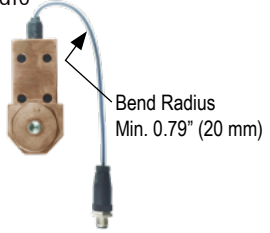
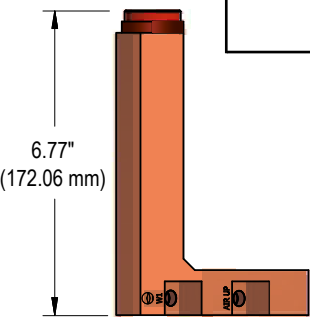
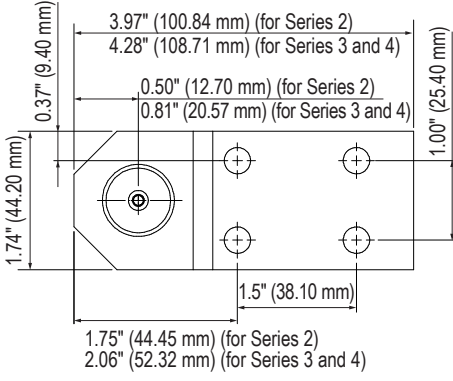


Attachment Screws
M = Metric (M6 x 1 x 35)
S = Standard (1/4" -20 x 1 1/2")
N = Not provided

NHP (No Head or Pin)
Note: Head and Pin must be ordered separately. The pin must be **HG Style** (see VeriFast LVDT Stud Weld Pin page).


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. The Signal Conditioner must be calibrated once the system is installed in place.

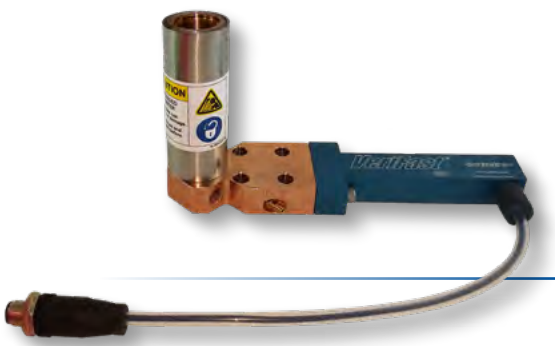


LVDT Signal Conditioner

Required for VeriFast LVDT Weld Bodies.
Part #: 606-67546

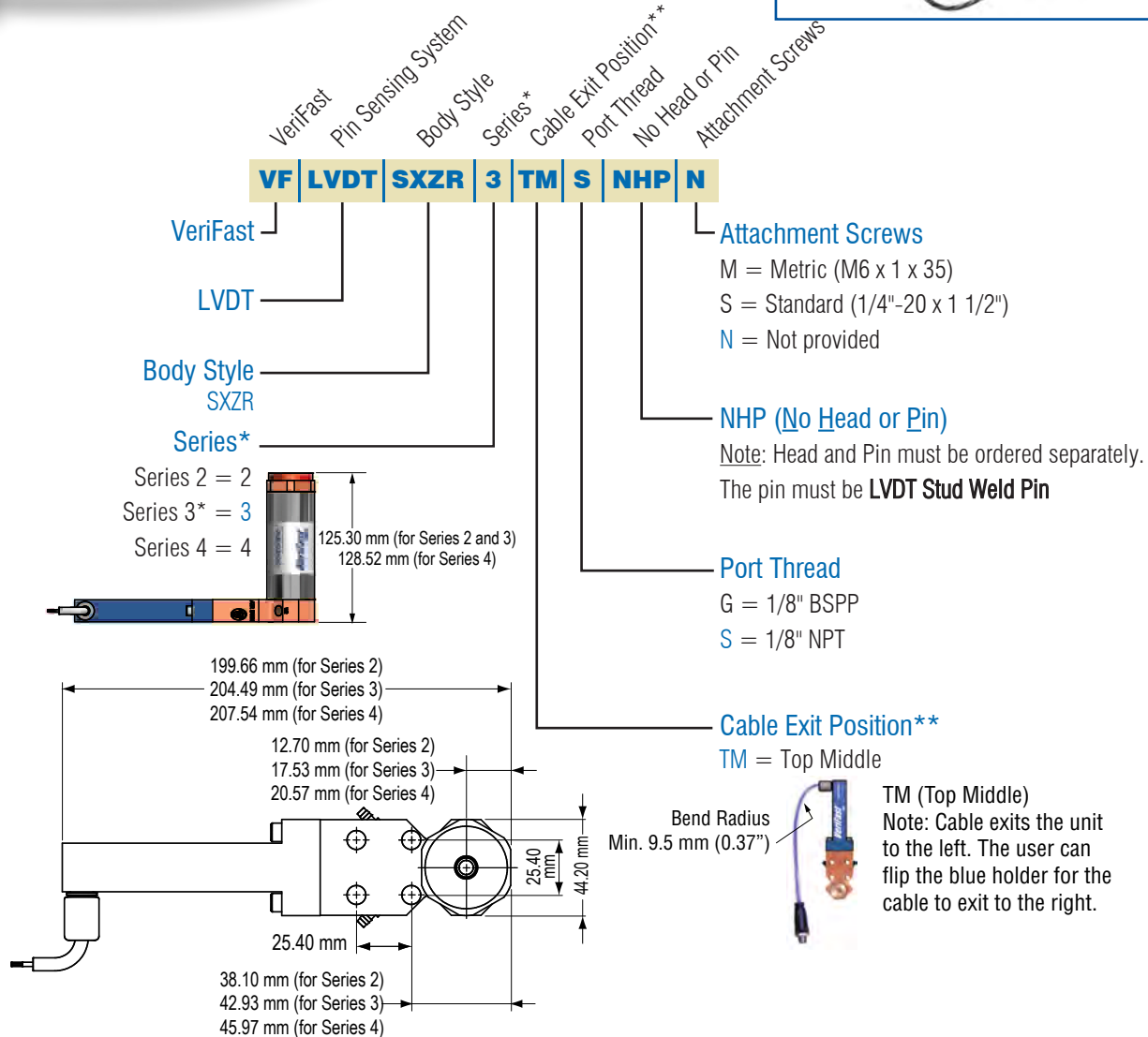
Weld Bodies VeriFast™ LVDT - SXZR

For Stud Welding applications where the stud length is 18-46 mm.



SXZR Kit for LVDT Weld Pin
(Supplied with all weld bodies)
Part #: 608-04935

Hex Tool
LVDT Cable / Lock Pin Assembly
Pin Lock



* 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).

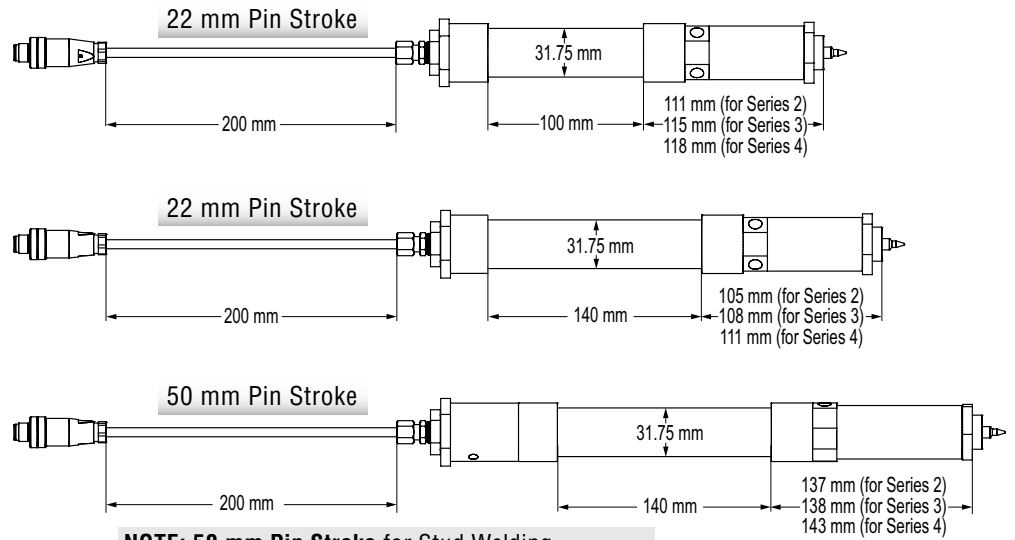
** To connect to the Signal Conditioner, the VeriFast LVDT requires a micro (12 mm), 5-pin, shielded, female tool cord.

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.

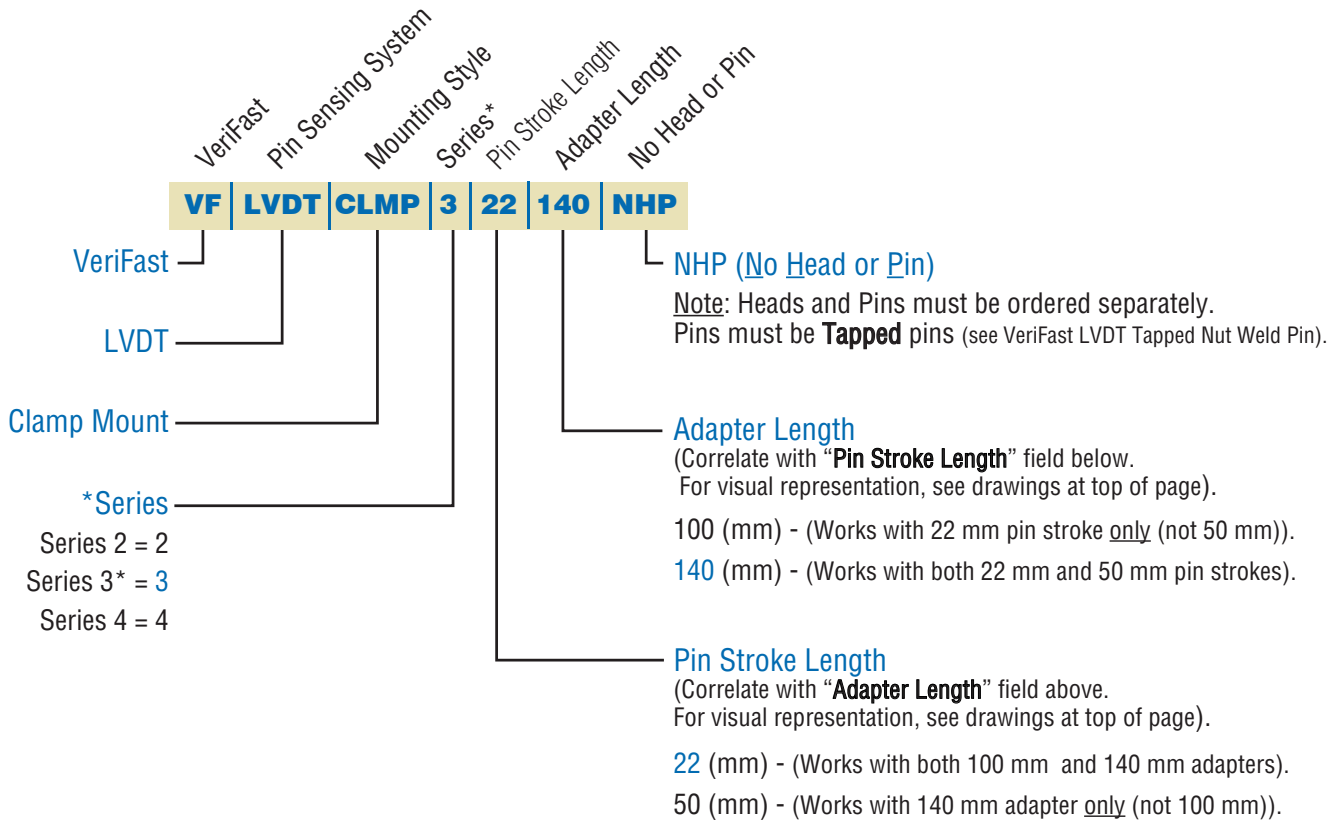
LVDT Signal Conditioner

Required for VeriFast LVDT Weld Bodies.
Part #: 606-67546

Weld Bodies VeriFast™ LVDT - Clamp Mount



NOTE: 50 mm Pin Stroke for Stud Welding applications where the stud length is 18-46 mm.



* 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.





LVDT Signal Conditioner

Required for VeriFast LVDT Weld Bodies.
Part #: 606-67546




Weld Pins

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
Preferred for manual part load, auto/manual nut load.	Preferred for robot part load, auto/manual nut load.	Preferred 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



Nose A
Nose B
Nose C
Nose D
Nose E

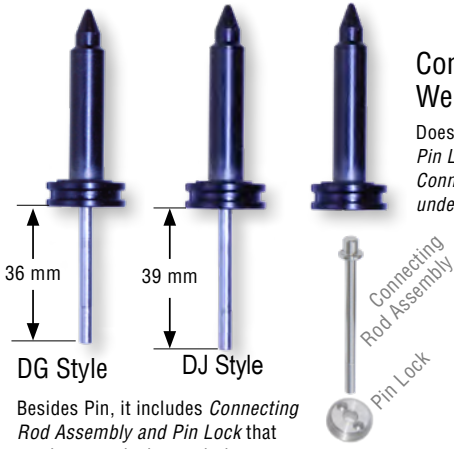
Auto/Manual Nut Load



Nose H
Nose K
Nose L
Nose M
Nose P

VeriFast™ LVDT Nut Weld Pin

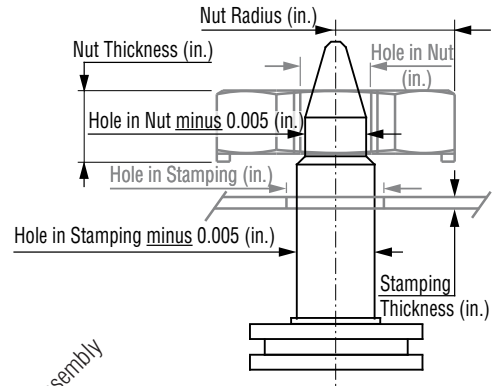
DG & DJ Style and Consumable Pin



Consumable Weld Pin (Only)

Does not include *Connecting Rod Assembly* and *Pin Lock*. Must be assembled with an existing *Connecting Rod Assembly* and *Pin Lock* (shown faded underneath).

Besides Pin, it includes *Connecting Rod Assembly* and *Pin Lock* that can be reused when ordering Consumable Pins only.

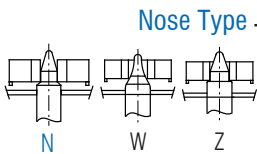


LVDT Nut Weld Pin Material Series Nose Type Hole in Stamping minus 0.005 (in.) Hole in Nut minus 0.005 (in.) Stamping Thickness (in.) Nut Thickness (in.) Nut Radius (in.) Style of Pin and Connecting Rod Assembly

SV | 3 | N | 348 | 270 | 25 | 47 | DG

LVDT Nut Weld Pin Material
 Stainless = RV
 Coated = KV
 DuraPin™ = SV

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



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
 DG for SXAR, SXKR, SXTR, SXQR, SXHR, SXJR, SXVR, SXWR
 DJ for SXCR, SXGR

If ordering **Consumable Weld Pin Only (No LVDT Connecting Rod 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**.



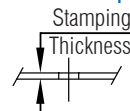
Nut Radius (2 decimals, measured in inches)
 Measured when Nut Feeding is done **Automatically**



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



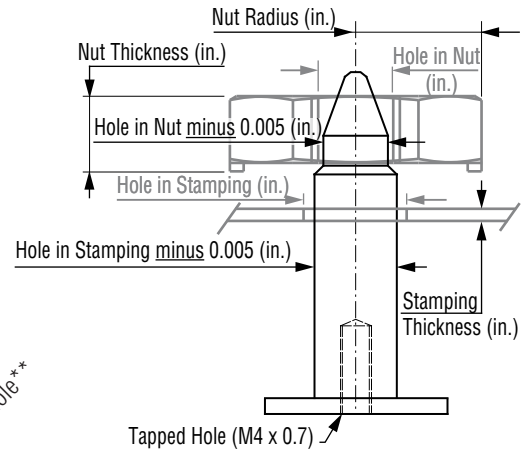
Stamping Thickness (2 decimals, measured in inches)



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

VeriFast™ LVDT Tapped Nut Weld Pin

For use with **Clamp Mount Weld Bodies**



Tapped Nut Weld Pin
 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 (in.) or
 Nut Radius (in.)
 Tapped Hole**

T J A 3 N 348 270 25 25 E

Tapped

Pin Finish/Material

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

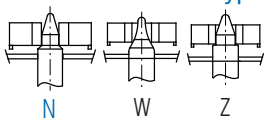
Pin Type

- A=Auto Load
- P=Manual Load

Series

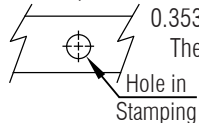
- Series 2 = 2
- Series 3 = 3
- Series 4 = 4

Nose Type



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**

E = M4 x 0.7

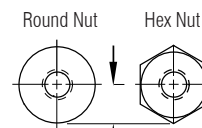
Nut Thickness (2 decimals, measured in inches)
 Measured when Nut Feeding is done **Manually**



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



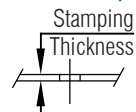
Nut Radius (2 decimals, measured in inches)
 Measured when Nut Feeding is done **Automatically**



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.

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

VeriFast™ LVDT Stud Weld Pin

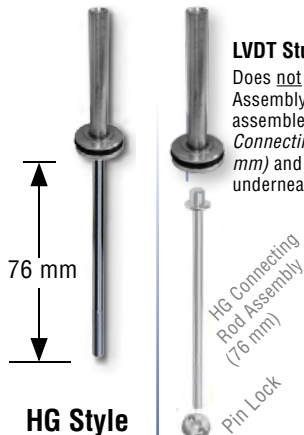
For use with **SXZR & SYVR** Weld Bodies

For use with **SXZR** Weld Bodies



LVDT Stud Weld Pin
(Must be assembled with the existing **LVDT Cable / Lock Pin Assembly** (shown faded underneath) located inside the SXZR Weld Body)

For use with **SYVR** Weld Bodies



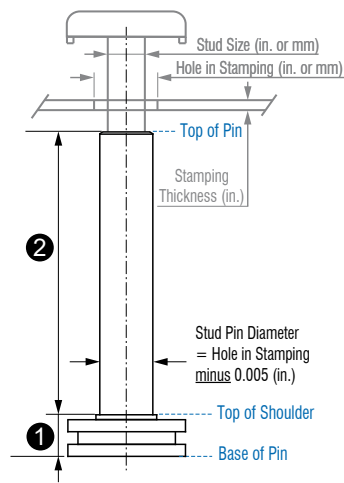
LVDT Stud Weld Pin (Only)
Does not include Connecting Rod Assembly and Pin Lock. Must be assembled with an existing **HG Connecting Rod Assembly (76 mm)** and **Pin Lock** (shown faded underneath).

Useful for Stud Welding applications where the stud length is 18-46 mm.

76 mm

HG Style

Besides the **LVDT Stud Weld Pin**, includes **HG Connecting Rod Assembly (76 mm)** and **Pin Lock** that can be reused when ordering **LVDT Stud Weld Pin** only.



LVDT Stud Weld Pin Material
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)
LVDT Connecting Rod Assembly Length**

SV P 3 M08 047 07 HG

LVDT Stud Weld Pin Material
Stainless = RV
Coated = KV
DuraPin™ = SV

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**

LVDT Connecting Rod Assembly Length**
HG = Includes an LVDT Stud Weld Pin, HG Connecting Rod Assembly, and Pin Lock.

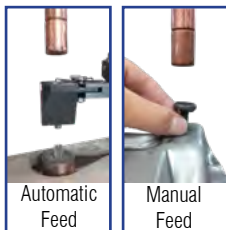
LVDT Cable/Lock Pin Assembly Length**
XZ
If ordering an LVDT Stud Weld Pin (Only), this field remains empty.

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



** The SYVR Weld Body uses the LVDT Stud Weld Pin assembled with the HG Connecting Rod Assembly and Pin Lock. The SXZR Weld Body uses the LVDT Stud Weld Pin connected to the LVDT Cable/Lock Pin Assembly.

Weld Pins

T G P 3 D 547 417 16 45 E

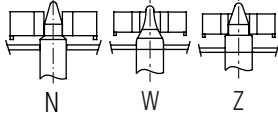
Add Prefix T for Tapped Pin

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

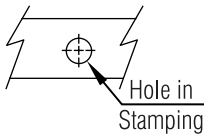
Pin Type
Manual = P
Automatic = A

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

Pin Nose Type
Recommended: N, W, or Z
Alternate: A, B, C, D, E, H, K, L, M, or P



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

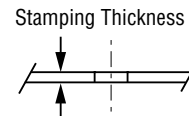
Tap Size (only for Tapped Pins)

Tap Size	
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"
F = M5 x 0.8	Min. pin OD = 0.240"
G = M6 x 1.0	Min. pin OD = 0.310"

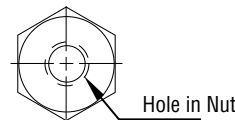
Nut Thickness (2 decimals, measured in inches)
Example: If Nut Thickness is 0.45", the number in this field will be 45.



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



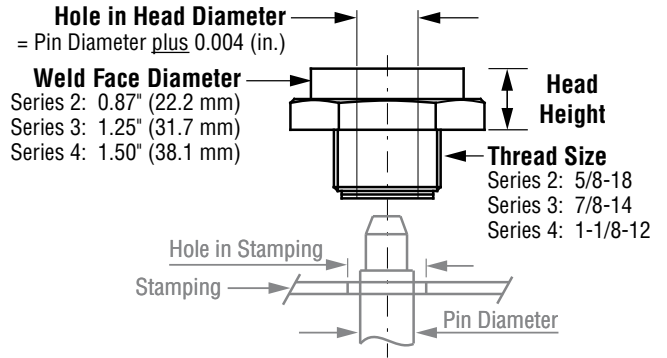
Hole in Nut minus 0.005
(3 decimals, measured in inches)
Example: If Hole in Nut is 0.422":
 $0.422" - 0.005" = 0.417"$
The number in this field is 417



Weld Head - GH Style



GH Style



	GH 3 050 T 125 352		
<p>Weld Head Prefix GH</p> <p>Series (must be consistent with Hole in Head Diameter and Weld Face Diameter on the right) Series 2 = 2 Series 3 = 3 Series 4 = 4</p> <p>Standard Head Height** Series 2 and 3 = 050 Series 4 = 062</p> <p>Material RWMA Class 3 = C RWMA Class 11 = T</p>	<p>Weld Head Prefix</p> <p>Series</p> <p>Head Height**</p> <p>Material</p> <p>Weld Face Diameter**</p> <p>Hole in Head Diameter</p>	<p>Hole in Head Diameter Max. 0.427" (10.85 mm) - for Series 2 Max. 0.642" (16.31 mm) - for Series 3 Max. 0.852" (21.64 mm) - for Series 4</p> <p><u>Important:</u> We recommend Hole in Head Diameter be 0.004" larger than the Pin Diameter. <u>Example:</u> 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 preferred Series 3 applies, since 0.352" < 0.642"). Exceptions are SXVR, SXWR weld bodies, which are Series 2 only.</p> <p>Standard Weld Face Diameter** 087 = 0.87" Weld Face (for Series 2) 125 = 1.25" Weld Face (for Series 3) 150 = 1.50" Weld Face (for Series 4)</p> <p><u>Important:</u> The Diameter of the Nut Projections must be at least 0.160" (4 mm) smaller than the Weld Face Diameter (or 0.080" (2 mm) radius difference). If it is not, the next larger weld head series should be used for the application. (Exceptions are SXVR and SXWR weld bodies, which are Series 2 only).</p>	<p>Hole in Head Diameter must be at least 0.080" (2 mm)</p> <p>Weld Face Diameter Nut Projections Diameter</p> <p>Weld Face Diameter Nut Projections Diameter must be at least 0.080" (2mm)</p>

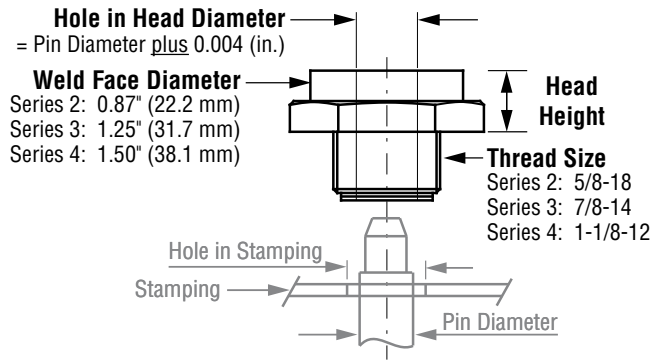
** Special sizes are available for larger dimension requirements or areas with clearance restrictions. Contact CenterLine for information.

Weld Head - PH Style



PH Style

- Lower cost
- Quick delivery
- For nut welding; not recommended for stud welding



Weld Head Prefix
PH

Series (must be consistent with Hole in Head Diameter and Weld Face 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

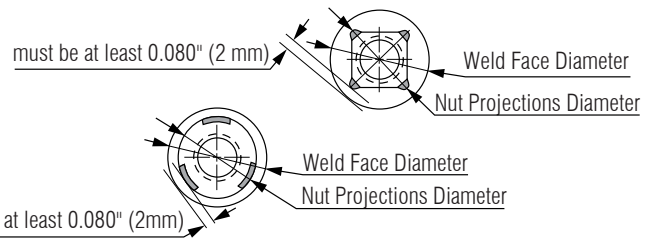
Hole in Head Diameter for PH Heads
Max. 0.377" (9.57 mm) - for Series 2
Max. 0.638" (16.20 mm) - for Series 3
Max. 0.825" (20.95 mm) - for Series 4

Important: 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 preferred Series 3 applies, since 0.352" < 0.642"). Exceptions are SXVR, SXWR weld bodies, which are Series 2 only.

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

Important: The Diameter of the Nut Projections must be at least 0.160" (4 mm) smaller than the Weld Face Diameter (or 0.080" (2 mm) radius difference). If it is not, the next larger weld head series should be used for the application. (Exceptions are SXVR and SXWR weld bodies, which are Series 2 only).

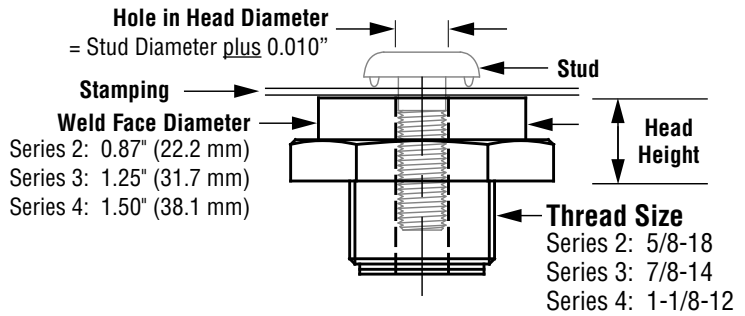


** Special sizes are available for larger dimension requirements or areas with clearance restrictions. Contact CenterLine for information.

Stud Weld Head - GH Style



GH Style



Weld Head Prefix
GH

Series (must be consistent with Hole in Head Diameter and Weld Face 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 = C
RWMA Class 11 = T

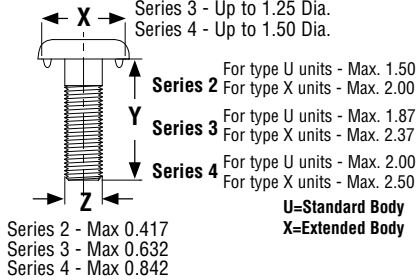
Hole in Head Diameter
Max. 0.427" (10.85 mm) - for Series 2
Max. 0.642" (16.31 mm) - for Series 3
Max. 0.852" (21.64 mm) - for Series 4

Important: We recommend 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 preferred Series 3 applies, since 0.440" < 0.632").

- Series 2 - Up to 0.87 Dia.
- Series 3 - Up to 1.25 Dia.
- Series 4 - Up to 1.50 Dia.

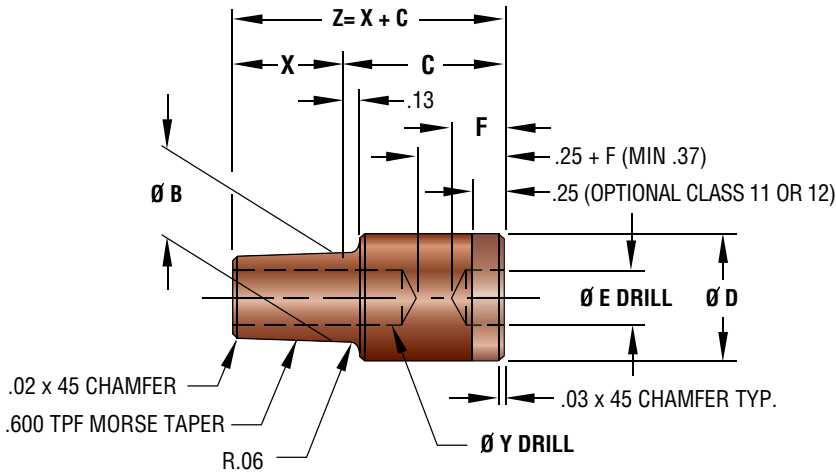


Weld Face Diameter**
087 = 0.87" Weld Face (for Series 2)
125 = 1.25" Weld Face (for Series 3)
150 = 1.50" Weld Face (for Series 4)

Important: The X, Y & Z dimensions of the Stud will determine the GH Weld Head Series.

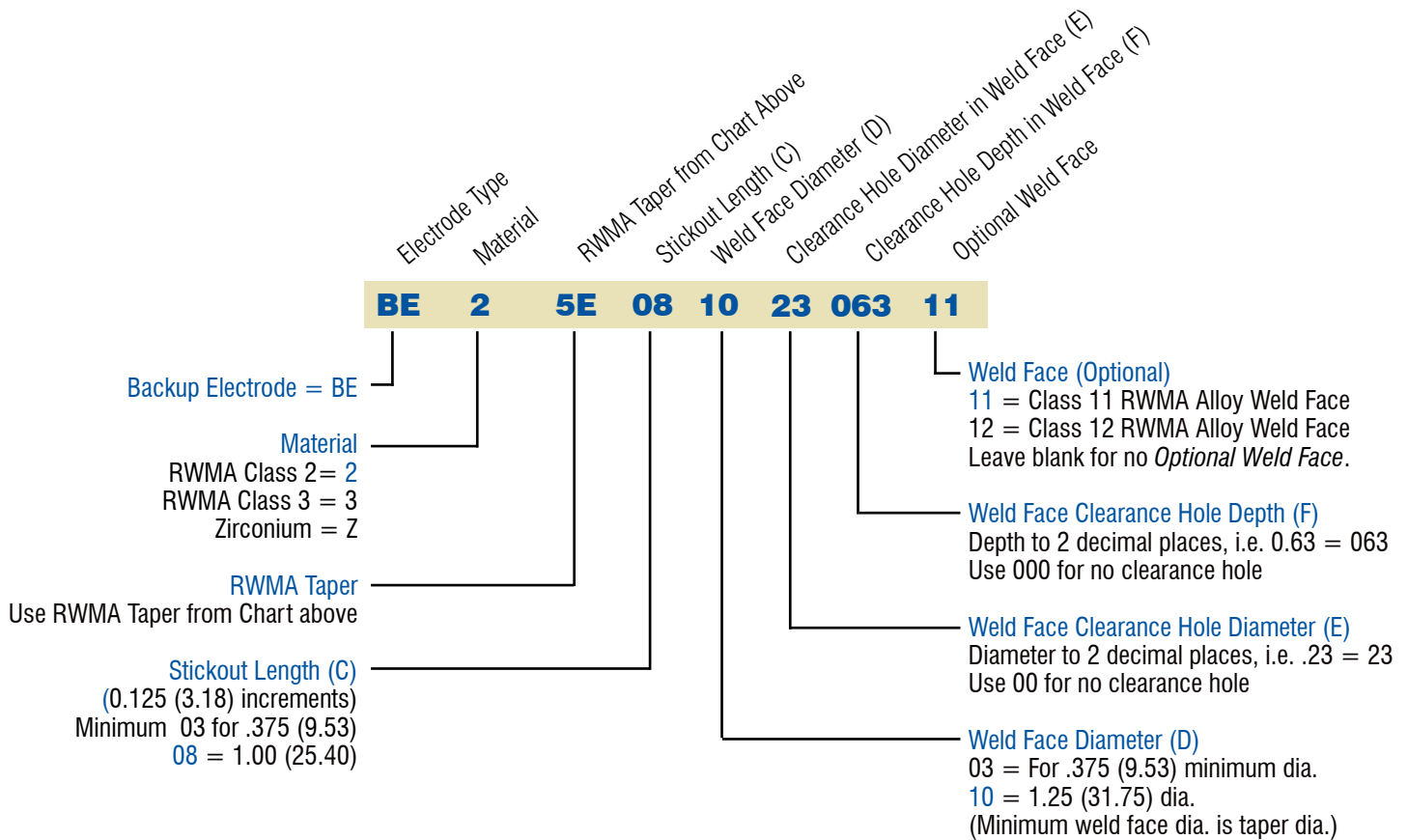
** Special sizes are available for larger dimension requirements or areas with clearance restrictions. Contact CenterLine for information.

Backup Electrodes BE (RWMA Taper)

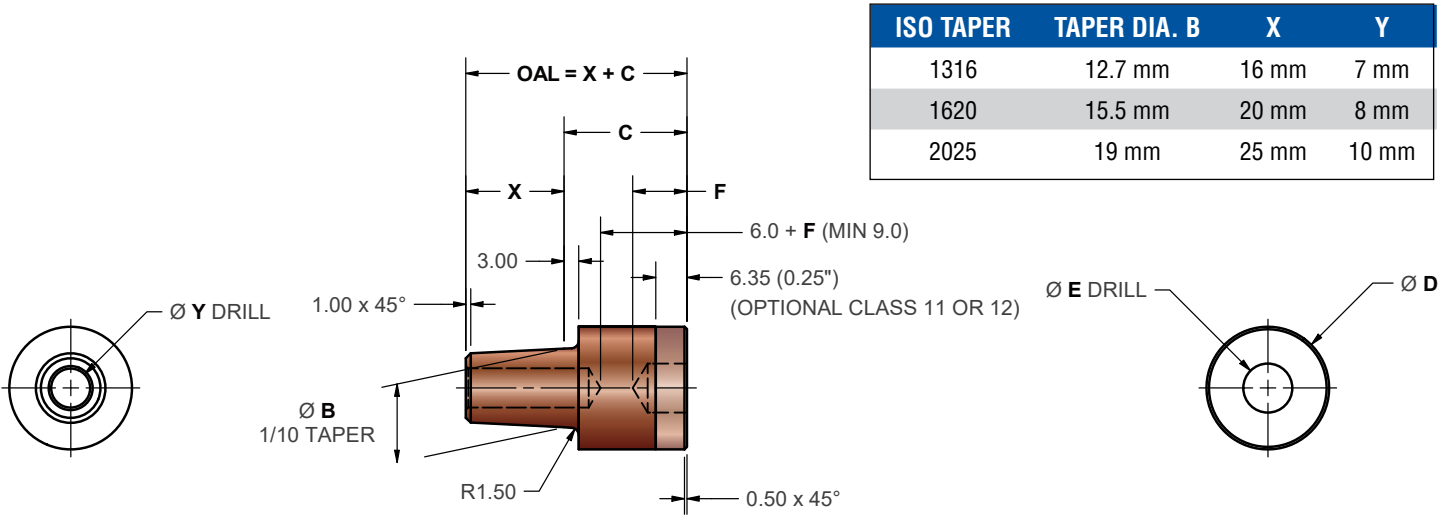


RWMA TAPER	B	X	Y
3E	.375 (9.52)	.500 (12.70)	9/32
4E	.463 (11.76)	.500 (12.70)	9/32
5E	.625 (15.88)	.750 (19.05)	3/8
6E	.750 (19.05)	.875 (22.23)	7/16
7E	.875 (22.23)	1.125 (28.57)	1/2
4C	.375 (9.52)	.285 (2.86)	9/32
5C	.415 (10.52)	.390 (9.52)	5/16
6C	.501 (12.70)	.500 (12.70)	3/8
7C	.613 (15.57)	.500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

• Dimensions Shown Are: inches (mm).



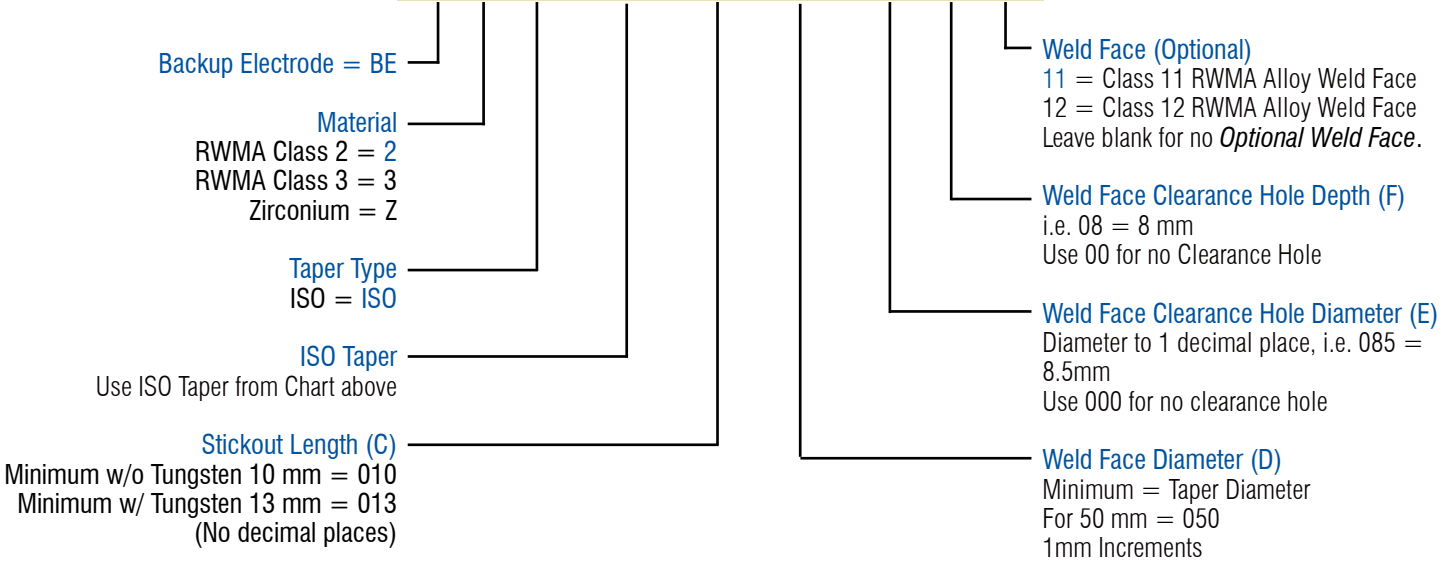
Backup Electrodes BE (ISO Taper)



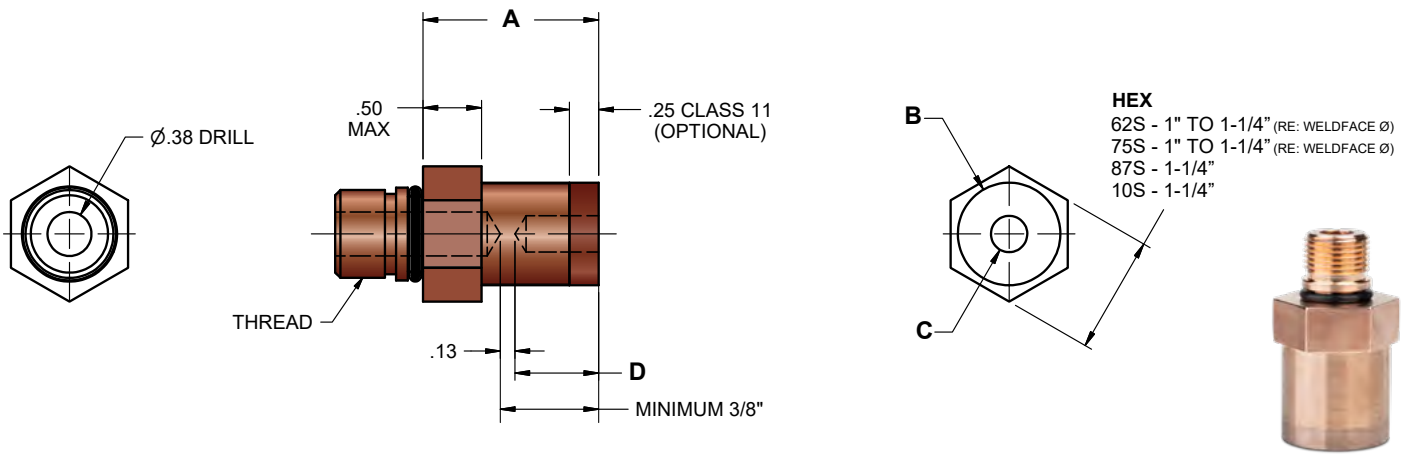
• Dimensions Shown Are: mm.

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")

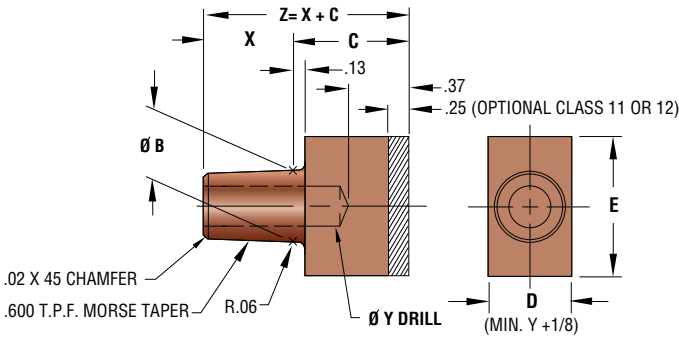
(B) Weld Face Diameter
 (measured in 1/8" increments)
 Minimum Diameter = 04 (1/2")
 Maximum Diameter = 10 (1-1/4")

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. 2 characters)
Example: If the Clearance Hole Diameter is 0.31", the number in this field will be 31.
 Use 00 for no clearance hole.

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

RBE Block Electrodes



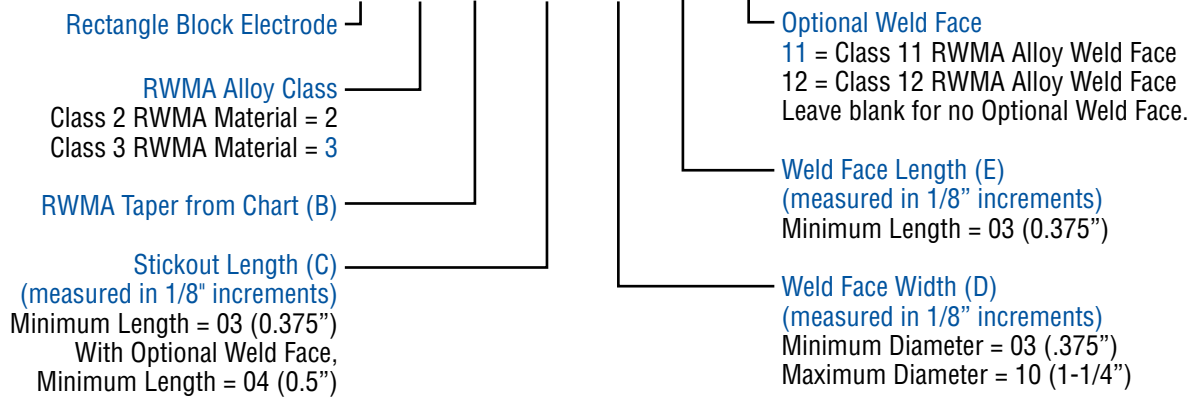
RWMA TAPER	B	X	Y
3E	.375 (9.52)	.500 (12.70)	9/32
4E	.463 (11.76)	.500 (12.70)	9/32
5E	.625 (15.88)	.750 (19.05)	3/8
6E	.750 (19.05)	.875 (22.23)	7/16
7E	.875 (22.23)	1.125 (28.57)	1/2
4C	.375 (9.52)	.285 (2.86)	9/32
5C	.415 (10.52)	.390 (9.52)	5/16
6C	.501 (12.70)	.500 (12.70)	3/8
7C	.613 (15.57)	.500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



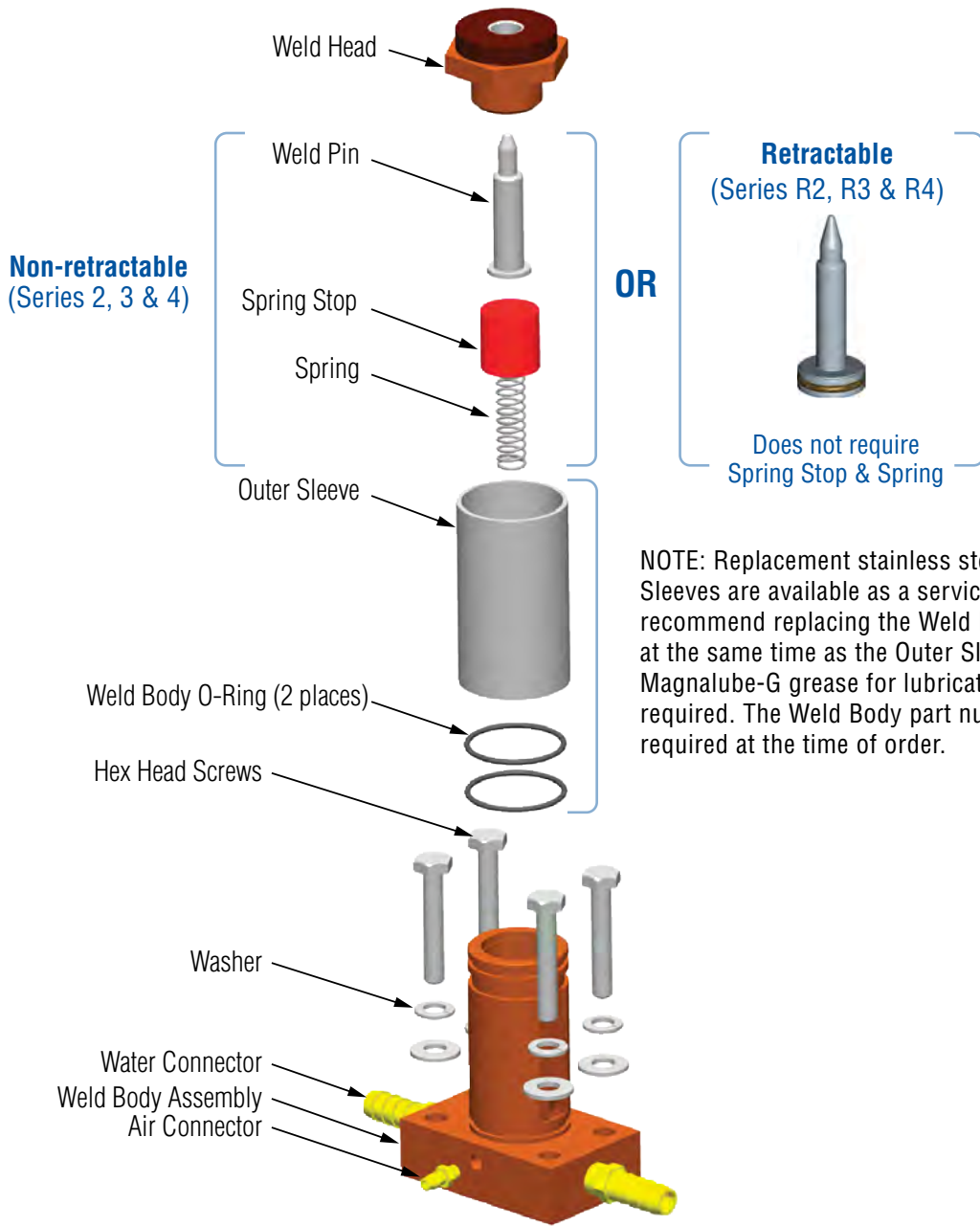
• Dimensions Shown Are: inches (mm).

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
 Series 2 - SLORD-013
 Series 3 - SLORD-017
 Series 4 - SLORD-017

Spring Stop

U2	SPRINGSTOP-U2
X2	SPRINGSTOP-X2
U3	SPRINGSTOP-U3
X3	SPRINGSTOP-X3
U4	SPRINGSTOP-U4
X4	SPRINGSTOP-X4

Spring

U2	SPRING037013050
U3 & U4	SPRING037025075
X2	SPRING037032100
X3 & X4	SPRING037034125

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

Air Connector BF1
Water Connector RW-1015
Nut Weld Contact CL-200-37

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)

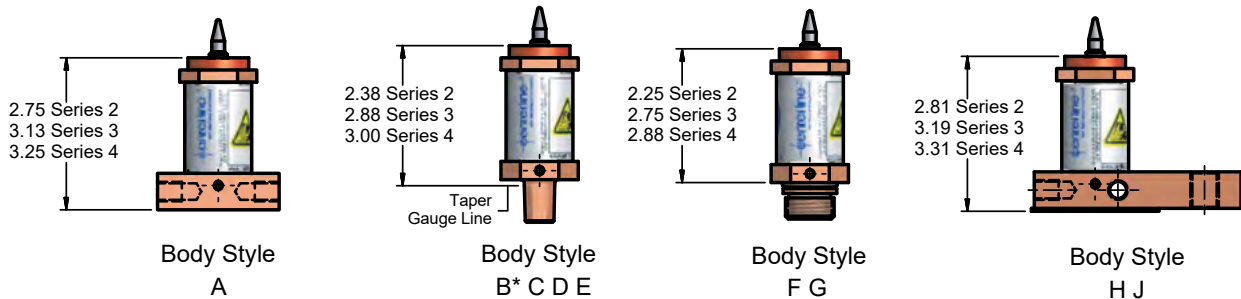
NHP (No Head or Pin) Note: Head and Pin must be ordered separately.
Use **Head Number** for complete Nut Welding unit
Use **Pin Number** for complete Nut Welding unit

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

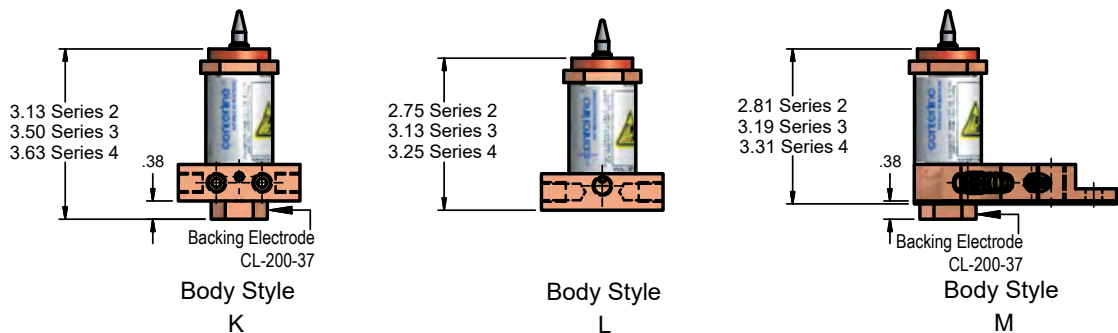
Series
2 = Series 2 (0.88 Weld Face)
3 = Series 3 (1.25 Weld Face)
4 = Series 4 (1.50 Weld Face)
R2 = Retractable Pin Series 2 (0.88 Weld Face)
R3 = Retractable Pin Series 3 (1.25 Weld Face)
R4 = Retractable Pin Series 4 (1.50 Weld Face)
Leave blank if ordering a complete Weld Body with Head and Pin, 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



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



Non-Detection Weld Bodies

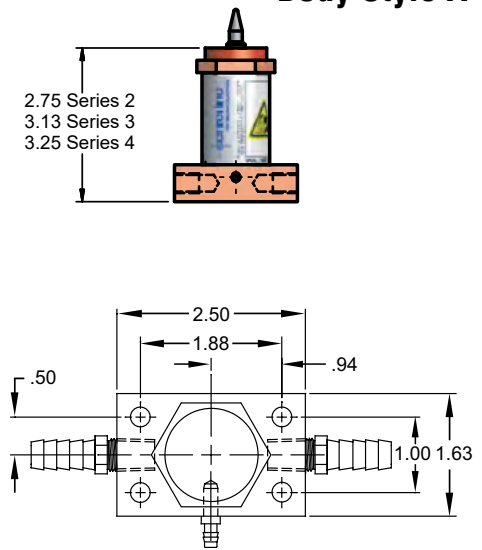


Non-Detection Body
Body Style
Series
Components

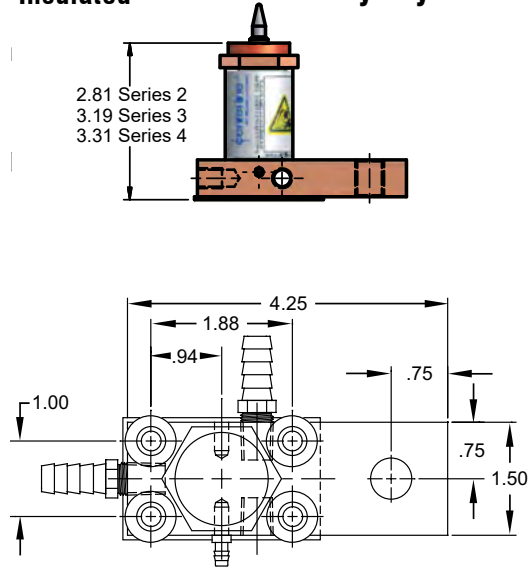
Base Mount Style Body

U 3 NHP

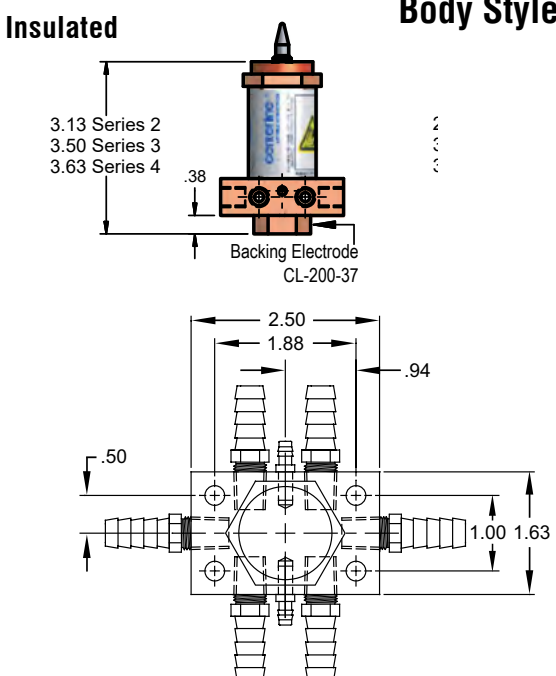
Body Style A



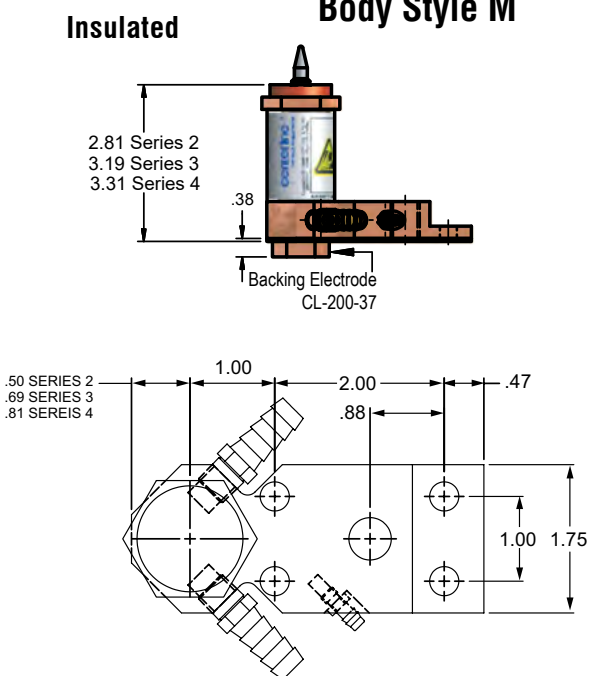
Insulated Body Style H&J



Body Style K



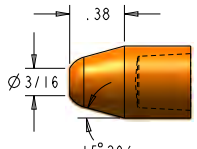
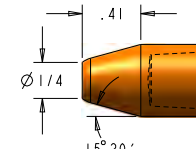
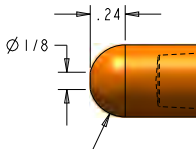
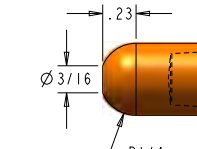
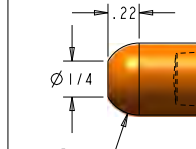
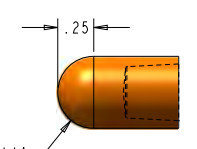
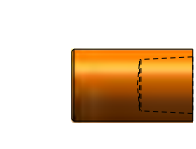
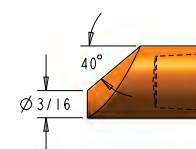
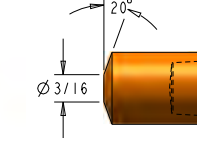
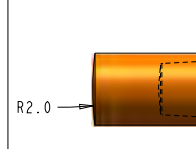
Body Style M

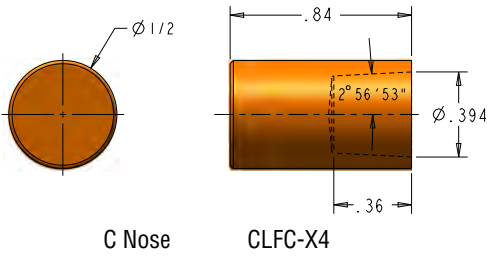


NOTE: Base units come with 1/4-20 screws for mounting & barb fittings.

Spot Welding Caps - Female

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

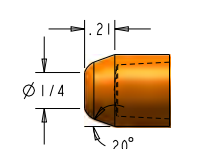
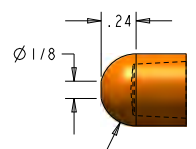
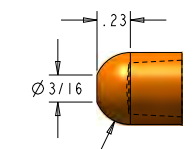
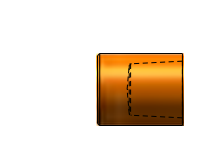
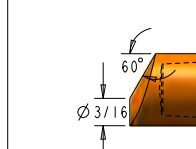
 <p>A Nose CLFA-X4</p>	 <p>A Nose CLFA-X4-250</p>	 <p>B Nose CLFB-X4</p>	 <p>B Nose CLFB-X4-188</p>	 <p>B Nose CLFB-X4-250</p>
 <p>B Nose CLFB-X4-R</p>	 <p>C Nose CLFC-X4</p>	 <p>D Nose CLFD-X4</p>	 <p>E Nose CLFE-X4</p>	 <p>F Nose CLFF-X4</p>

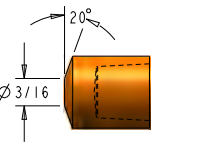
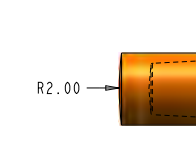


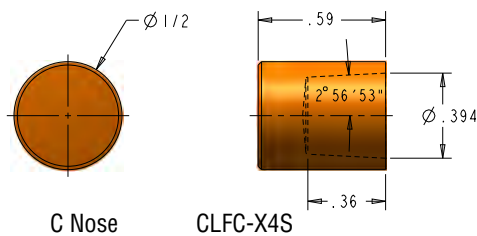
CLF C- X 4 (shown)

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>
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 <p>E Nose CLFE-X4S</p>	 <p>F Nose CLFF-X4S</p>
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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

Custom caps are available upon request.

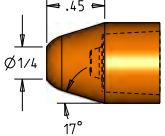
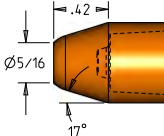
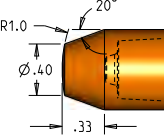
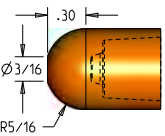
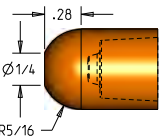
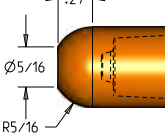
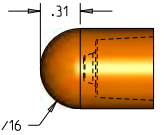
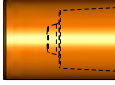
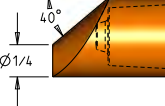
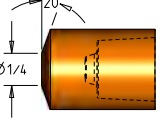
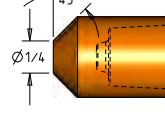
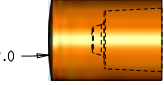
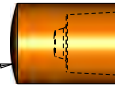
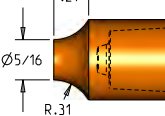
GLIDCOP® is a registered trademark of North American Hogan's High Alloys LLC.

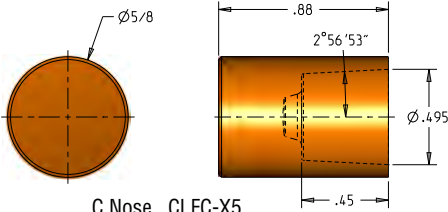
Female cap material markings will appear internally and/or externally.

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

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	

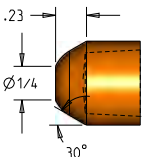
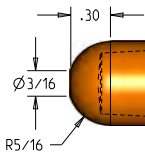
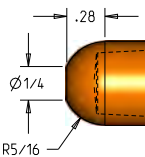

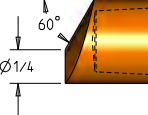
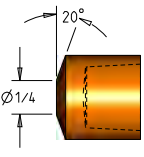
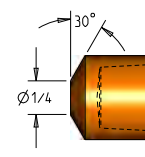
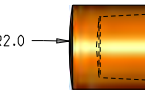


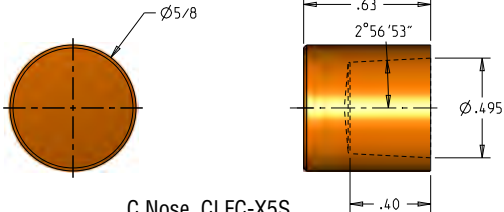
C Nose CLFC-X5

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.

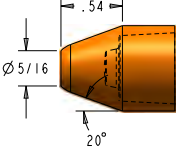
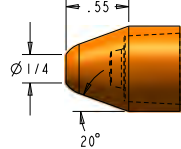
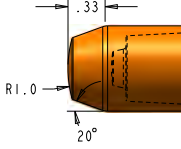
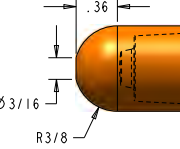
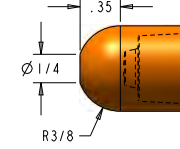
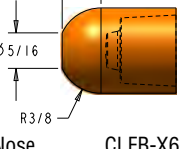
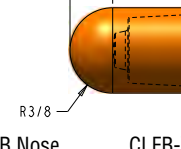
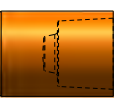
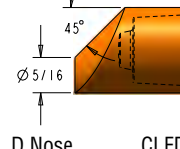
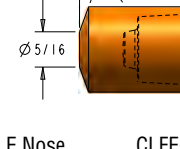
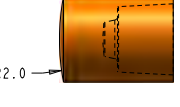
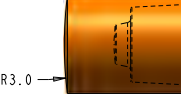
Code	Material	Internal Hole	External Marking
2	RWMA Class 2 CuCrZr	✱	
Z	RWMA Class 1 CuZr	⊙	∪
G	RWMA Class 20 GLIDCOP® AL-60	◇	∇

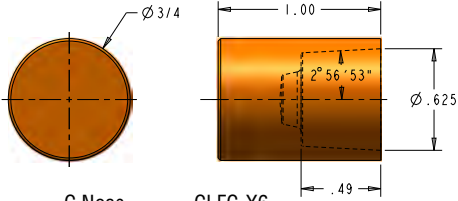
Custom caps are available upon request.

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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>			



C Nose CLFC-X6

CLF C- X 6 (shown)

CenterLine Female Cap
Nose Designation

Material

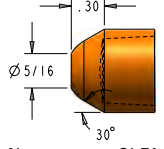
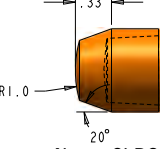
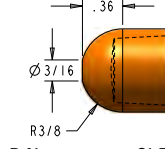
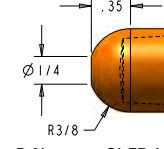
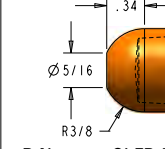

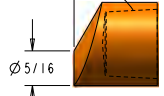
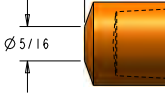
2 = Class 2 CuCrZr

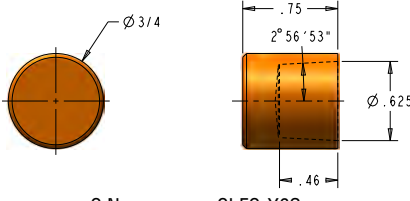
Z = Class 1 CuZr

G = Class 20 Glidcop® AL-60,
Dispersion Strengthened Copper

Major Diameter (1/8" increments)

CenterLine #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>		



C Nose CLFC-X6S

CLF C- X 6S (shown)

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

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

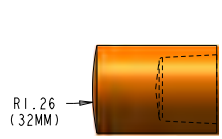
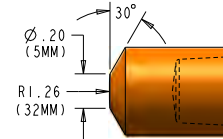
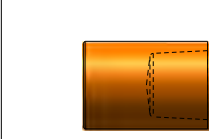
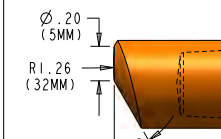
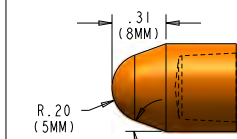
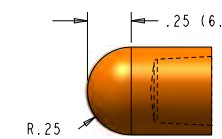
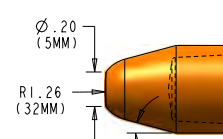
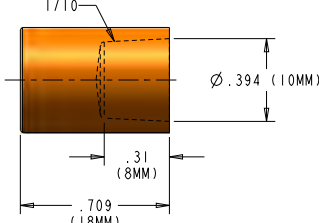
Code	Material	Internal Hole	External Marking
2	RWMA Class 2 CuCrZr	✱	
Z	RWMA Class 1 CuZr	⊖	∪
G	RWMA Class 20 GLIDCOP® AL-60	◇	∇

Custom caps are available upon request.

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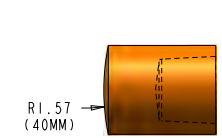
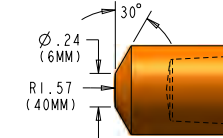
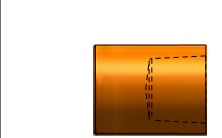
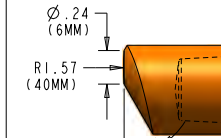
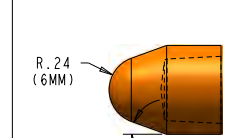
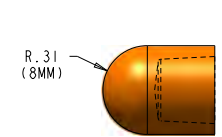
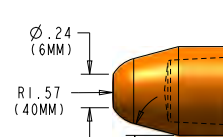
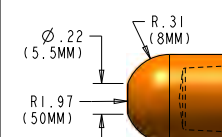
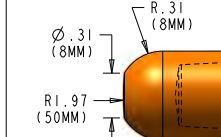
Spot Welding Caps - Female

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

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	 FI Nose ISO-5821-FI-16-20-50-55-X	 D Nose ISO-5821-D16X20-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

Custom caps are available upon request.

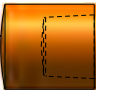
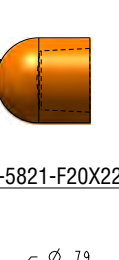
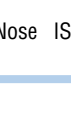


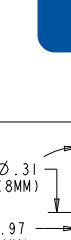
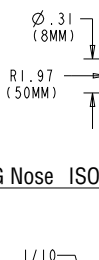
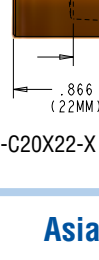

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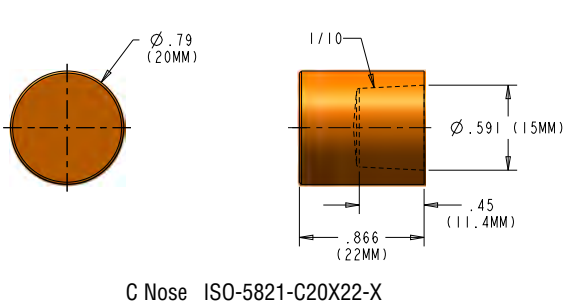
Female cap material markings will appear internally and/or externally.

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 20mm x 22mm - Standard Length

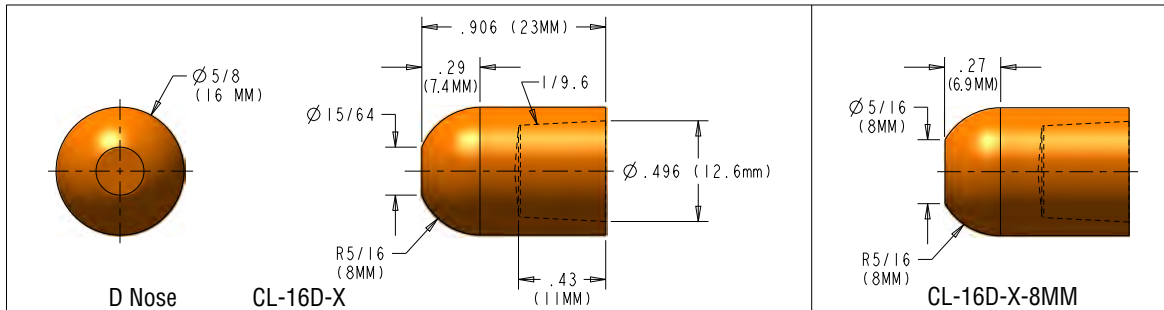
 A Nose ISO-5821-A20X22-X	 B Nose ISO-5821-B20X22-X	 C Nose ISO-5821-C20X22-X	 D Nose ISO-5821-D20X22-X	 E Nose ISO-5821-E20X22-X
 F Nose ISO-5821-F20X22-X	 G Nose ISO-5821-G20X22-X	 FI Nose ISO-5821-FI-20-22-50-7-X	 FI Nose ISO-5821-FI-20-50-8-X	



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.

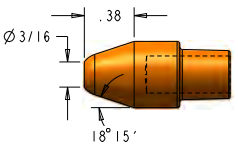
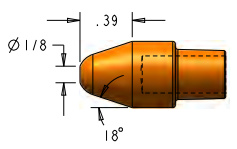
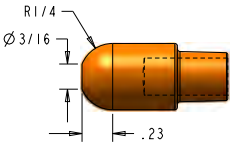
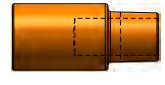
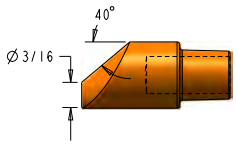
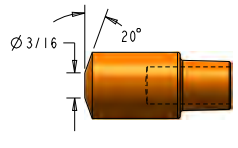
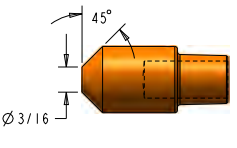

Code	Material	Internal Hole	External Marking
2	RWMA Class 2 CuCrZr	✱	
Z	RWMA Class 1 CuZr	⊙	∪
G	RWMA Class 20 GLIDCOP® AL-60	◇	∨

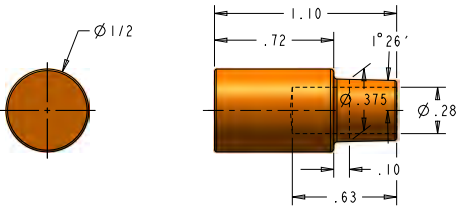
Custom caps are available upon request.

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Spot Welding Caps - Male

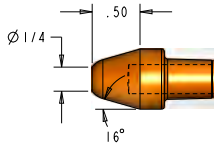
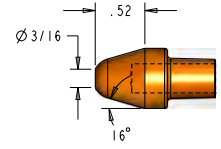
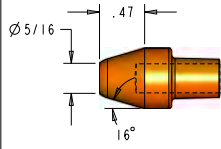
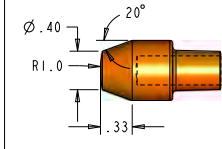
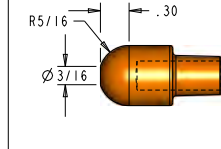
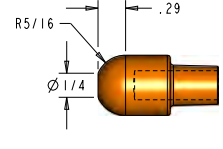
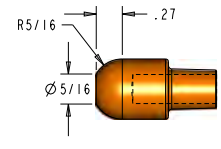
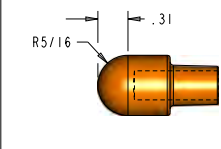
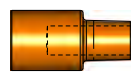
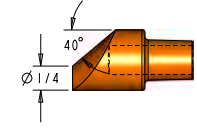
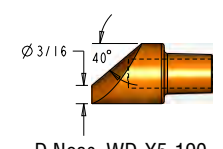
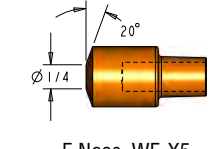
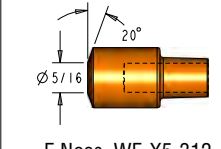
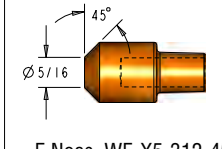
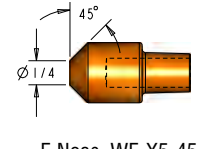
CenterLine #4 Caps - 1/2" Diameter - Standard Length

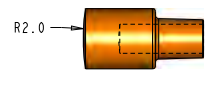
 <p>A Nose WA-X4</p>	 <p>A Nose WA-X4-125</p>	 <p>B Nose WB-X4</p>	 <p>C Nose WC-X4</p>	 <p>D Nose WC-X4</p>
 <p>E Nose WE-X4</p>	 <p>E Nose WE-X4-45</p>	 <p>F Nose WF-X4-2</p>	<p>WC - X4 (shown)</p> <p>CenterLine Male Cap</p> <p>Nose Type</p> <p>Material</p> <p>2 = Class 2 CuCrZr</p> <p>Z = Class 1 CuZr</p> <p>G = Class 20 Glidcop® AL-60, Dispersion Strengthened Copper</p> <p>Weld Face Diameter (mm)</p>	



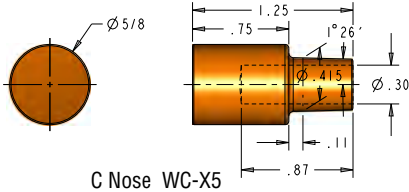
C Nose WC-X4

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

 <p>A Nose WA-X5</p>	 <p>A Nose WA-X5-190</p>	 <p>A Nose WA-X5-312</p>	 <p>705 Nose WA-X5-705</p>	 <p>B Nose WB-X5</p>
 <p>B Nose WB-X5-250</p>	 <p>B Nose WB-X5-312</p>	 <p>B Nose WB-X5-R</p>	 <p>C Nose WC-X5</p>	 <p>D Nose WD-X5</p>
 <p>D Nose WD-X5-190</p>	 <p>E Nose WE-X5</p>	 <p>E Nose WE-X5-312</p>	 <p>E Nose WE-X5-312-45</p>	 <p>E Nose WE-X5-45</p>



F Nose WF-X5-2



C Nose WC-X5

WC- X5 (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.

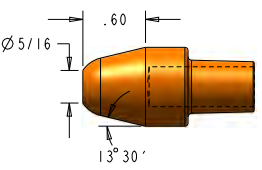
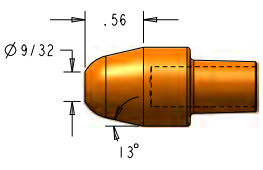
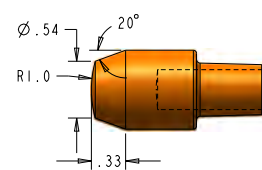
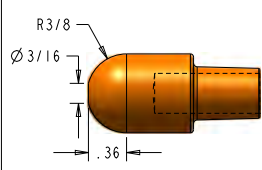
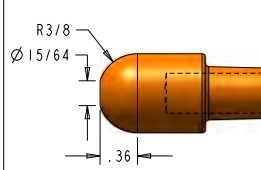
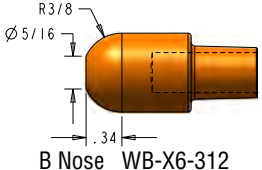
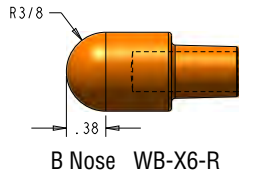
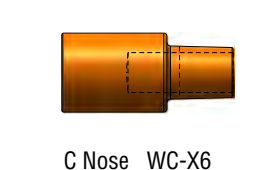
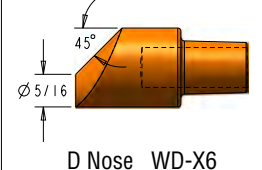
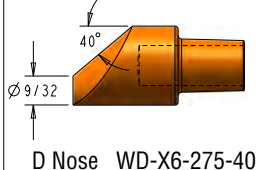
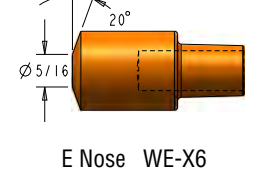
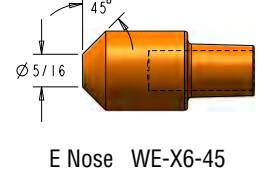
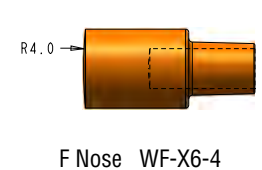
Code	Material	External Marking
2	RWMA Class 2 CuCrZr	
Z	RWMA Class 1 CuZr	☺
G	RWMA Class 20 GLIDCOP® AL-60	☑

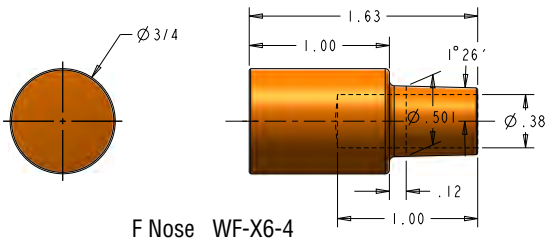
Custom caps are available upon request.

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

Spot Welding Caps - Male

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

 <p>A Nose WA-X6</p>	 <p>A Nose WA-X6-280</p>	 <p>705 Nose WA-X6-705</p>	 <p>B Nose WB-X6</p>	 <p>B Nose WB-X6-236</p>
 <p>B Nose WB-X6-312</p>	 <p>B Nose WB-X6-R</p>	 <p>C Nose WC-X6</p>	 <p>D Nose WD-X6</p>	 <p>D Nose WD-X6-275-40</p>
 <p>E Nose WE-X6</p>	 <p>E Nose WE-X6-45</p>	 <p>F Nose WF-X6-4</p>		



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)

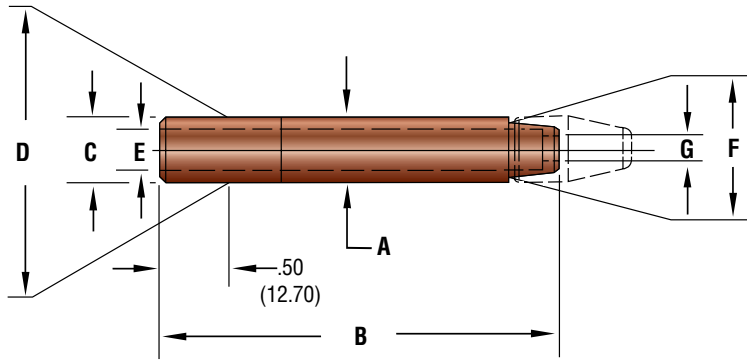
Custom caps are available upon request.

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

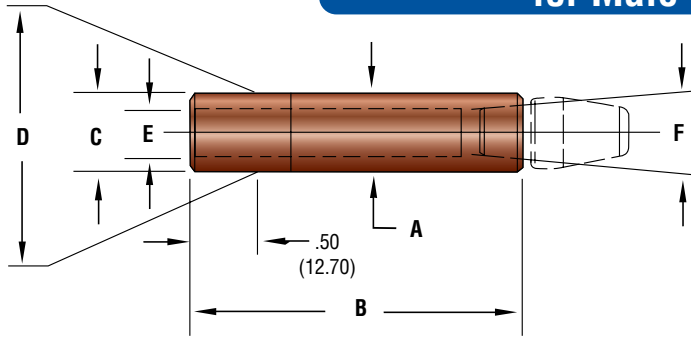
EXAMPLE:
MALE ADAPTER, CLASS 2, RW 6 TAPER,
2.50 (63.50) O.A.L., THRU WATER HOLE

• **CLF - 2610T**

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

ITEM NO.	DIMENSIONS						
	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

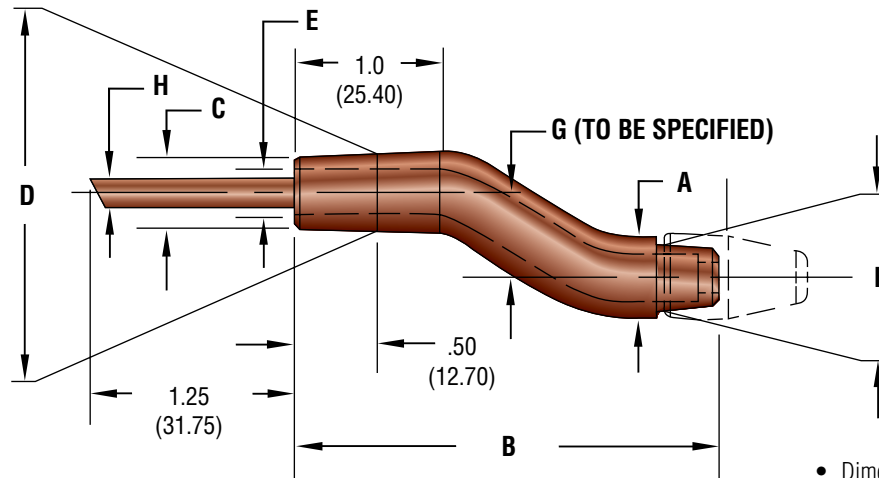
EXAMPLE:

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

- **WG - 3405**

ITEM NO.	DIMENSIONS					
	A	B	C	D	E	F
CLASS 2	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	B	C	D	E	F	G	H
CLASS 2	Major Diameter	Shank Overall Length	Minor Taper Diameter	Gauging Taper Diameter	Water Hole Diameter	Cap End Taper Diameter	Offset	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.**

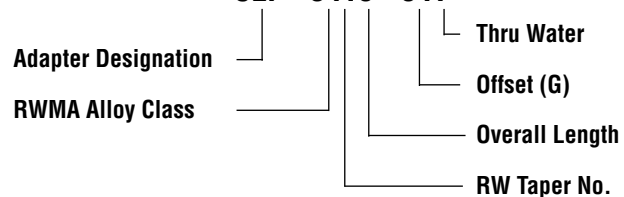
EXAMPLE:

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

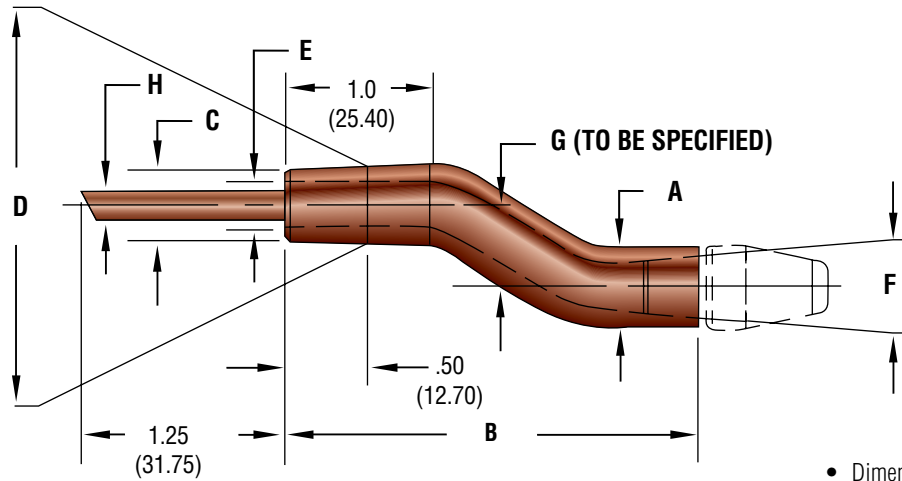
KEY TO ITEM NUMBERS

- 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 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
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

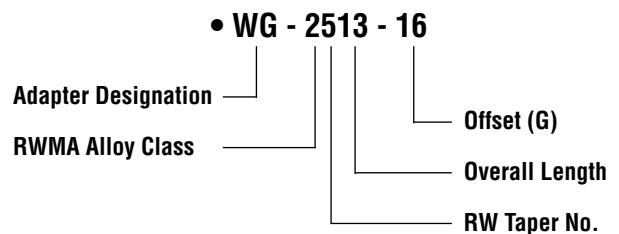
KEY TO ITEM NUMBERS

- 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

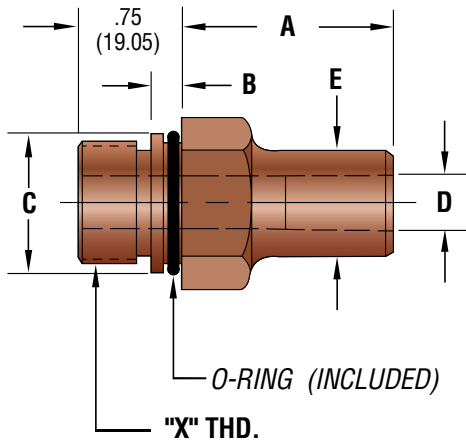
• **ADDITIONAL LENGTHS ARE AVAILABLE UPON REQUEST.**

EXAMPLE:

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



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

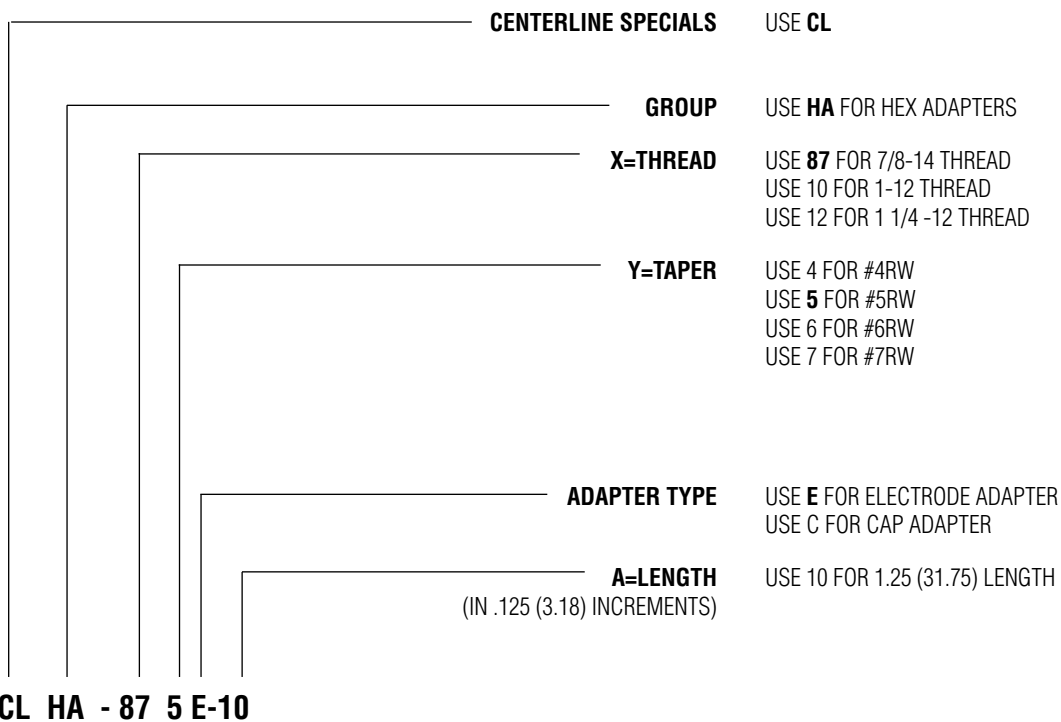
THREAD	"X"	B	C	HEX	O-RING	E
7/8-14	87	0.25 (6.35)	1 (25.40)	1-1/4	SLORD-117	1.22
1-12	10	0.25 (6.35)	1.13 (28.58)	1-1/4	SLORD-119	1.22
1-1/4-12	12	0.25 (6.35)	1.38 (34.93)	1-1/2	SLORD-123	1.47

EXAMPLE:

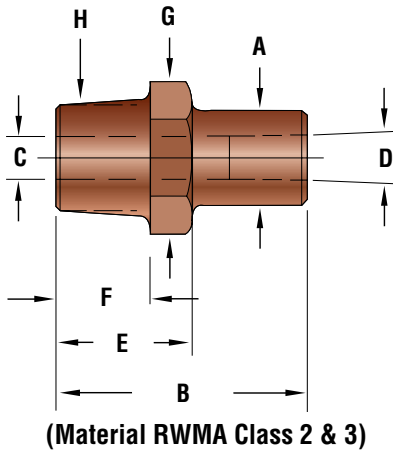
• **CLHA - 875E-10**

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

EXAMPLE EXPLANATION CODING

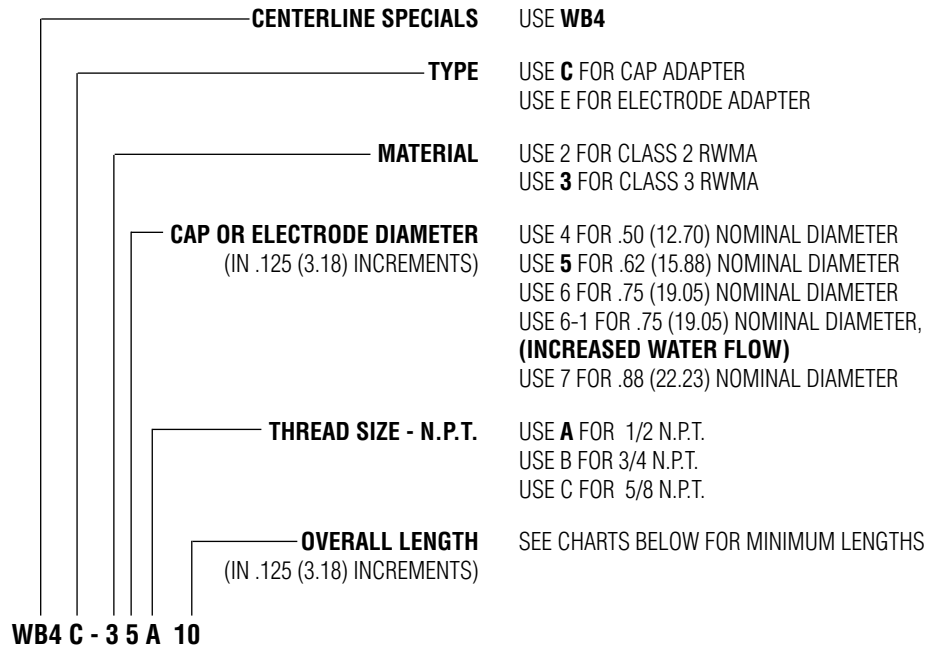


Cap and Electrode Hex Adapters Pipe Thread



• Dimensions Shown Are: inches (mm).

EXAMPLE EXPLANATION CODING



EXAMPLE:

• **WB4C-35A10**

Electrode Adapter Chart

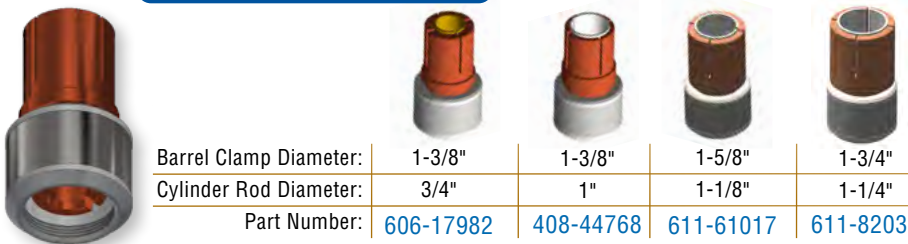
ELECTRODE CODE	4	5	4	5	5	6	7
A- DIAMETER	0.88 (22.35)	0.94 (23.88)	0.88 (22.35)	0.94 (23.88)	0.94 (23.88)	1.09 (27.69)	1.24 (31.50)
B- LENGTH	AS CODED						
LENGTH (Minimum)	0.88 (22.35)	0.88 (22.35)	1.00 (25.40)	1.00 (25.40)	1.12 (28.45)	1.12 (28.45)	1.38 (35.05)
C- HOLE DIAMETER	0.42 (10.67)	0.44 (11.18)	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)	0.463 (15.88)	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)	1.00 (25.40)	1.00 (25.40)	1.38 (35.05)	1.38 (35.05)	1.38 (35.05)
F- THREAD LENGTH	0.62 (15.75)	0.62 (15.75)	0.75 (19.05)	0.75 (19.05)	0.88 (22.35)	0.88 (22.35)	0.88 (22.35)
G- HEX	1.00 (25.40)	1.00 (25.40)	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	5/8	5/8	3/4	3/4	3/4

Cap Adapter Chart

ELECTRODE CODE	4	5	4	5	5	6	6-1	7
A- DIAMETER	0.50 (12.70)	0.62 (15.75)	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)	1.00 (25.40)	1.00 (25.40)	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)	0.28 (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	0.313 (7.95)	0.414 (10.52)	0.313 (7.95)	0.414 (10.52)	0.414 (10.52)	0.500 (12.70)	0.562 (14.27)	0.700 (17.78)
E- HEX LENGTH	0.88 (22.35)	0.88 (22.35)	1.00 (25.40)	1.00 (25.40)	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)	0.75 (19.05)	0.75 (19.05)	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)	1.00 (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	5/8	5/8	3/4	3/4	3/4	3/4


Quick Change Electrodes

Quick Change Barrel



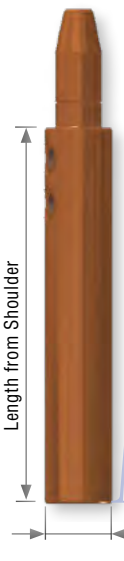
Barrel Clamp Diameter:	1-3/8"	1-3/8"	1-5/8"	1-3/4"
Cylinder Rod Diameter:	3/4"	1"	1-1/8"	1-1/4"
Part Number:	606-17982	408-44768	611-61017	611-82033

Quick Change Clamp



Part Number: 408-44601

Quick Change Adapter



Length from Shoulder

Adapter Diameter

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

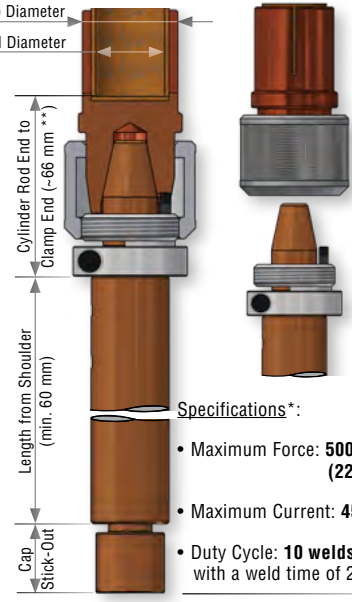
Length from Shoulder (measured in mm. Minimum 60 mm)
 Example: If this length is 60 mm, the number in this field will be 060.

Taper Code

1316	4E	4C
1620	5E	5C
2025	6E	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



Barrel Clamp Diameter

Cylinder Rod Diameter

Cylinder Rod End to Clamp End (~66 mm)**

Length from Shoulder (min. 60 mm)

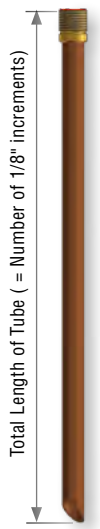
Cap Stick-Out

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.

Water Tube



Total Length of Tube (= Number of 1/8" increments)

Water Tube

Type

Tube Length Increments


CLT 1900 12

Water Tube = CLT

Type

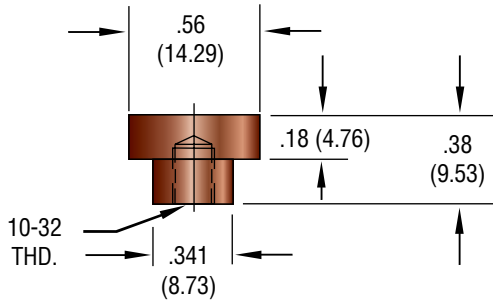
Tube Length Increments (total length of tube, measured in 1/8" increments.)
 To determine the number of 1/8" increments (for the length of the water tube), apply the following formula: "Length from Shoulder" x 0.315 - 7 (see the Quick Change Adapter part numbering system above for the "Length from Shoulder"). 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

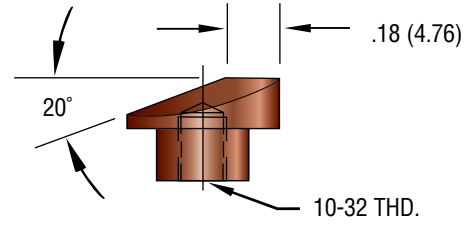


For various configurations, see the pages that follow. These configurations can include: **Backup Electrode** only, **Backup Electrode and Hex Adapter**, or **Hex Electrode** only.

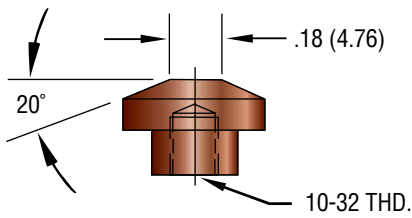
Replaceable Button Caps



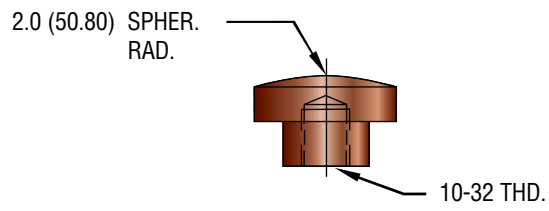
"C" NOSE - No. XC-2998



"D" NOSE - No. XD-2998

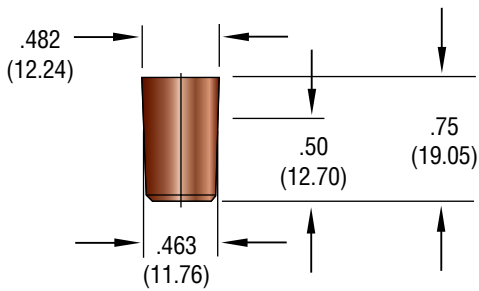


"E" NOSE - No. XCT-2998

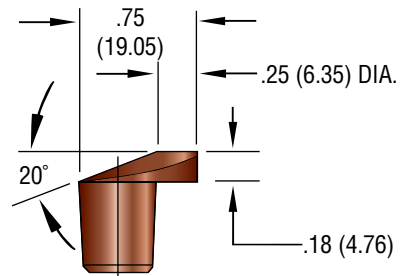


"F" NOSE - No. XR-2998

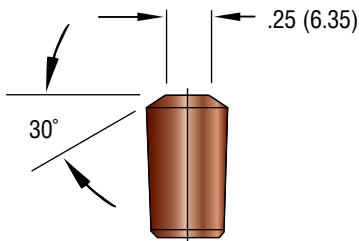
(Material RWMA Class 2)



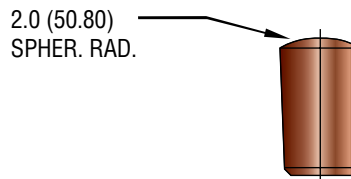
"C" NOSE - No. CLPC-2998



"D" NOSE - No. CLPD-2998



"E" NOSE - No. CLPT-2998



"F" NOSE - No. CLPR-2998

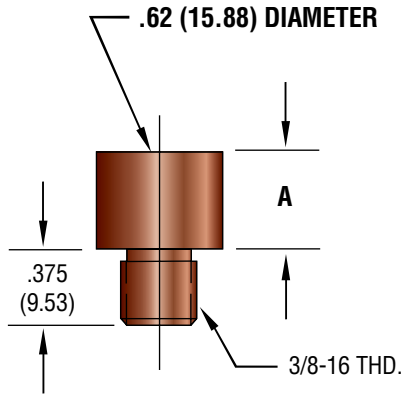
(Material RWMA Class 2)

- Dimensions Shown Are: inches (mm).

Button Caps

EXAMPLE – CLR2-78-AY

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

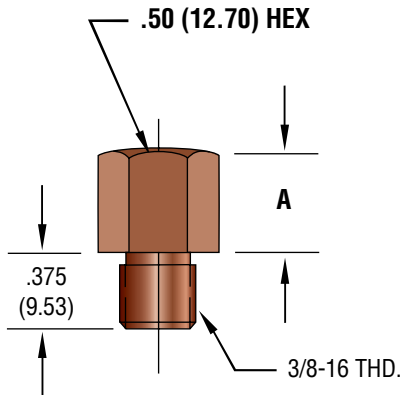


(Material RWMA Class 2, 3 & Zirconium)

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

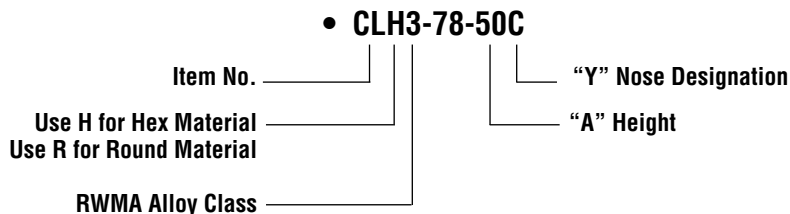
- * A = Pointed
- * B = Dome
- C = Flat (Shown)
- * E = Truncated (20°)
- F = .62 (15.88) Radius

* 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.

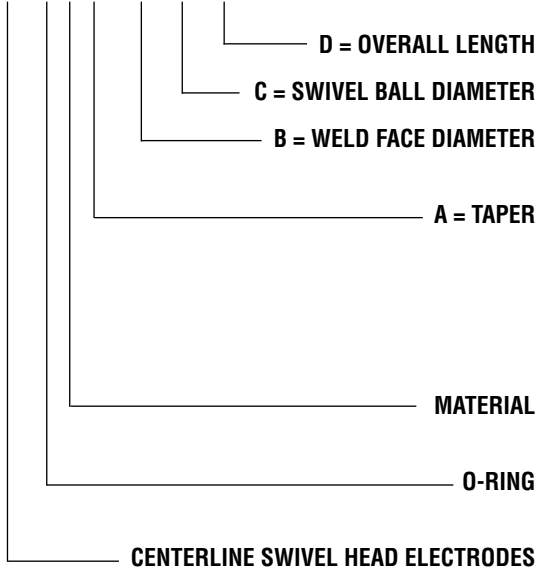


NOTE: Other thread sizes and shapes are available.

Swivel Head Electrodes with Water-Cooled Shanks

CODING EXAMPLE

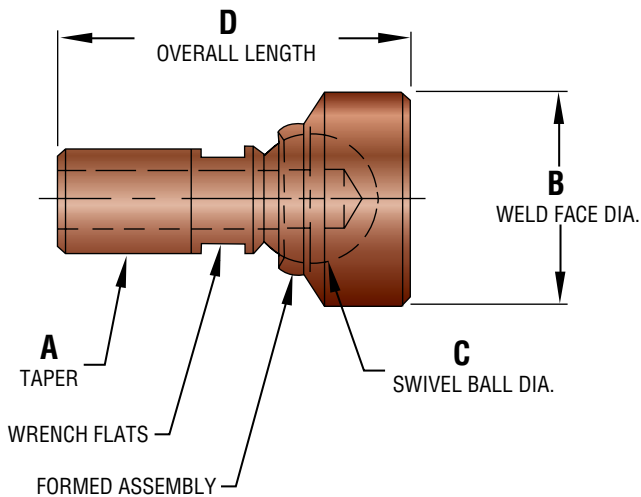
SHEA 0 2 5E XXX ZZ YYY



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

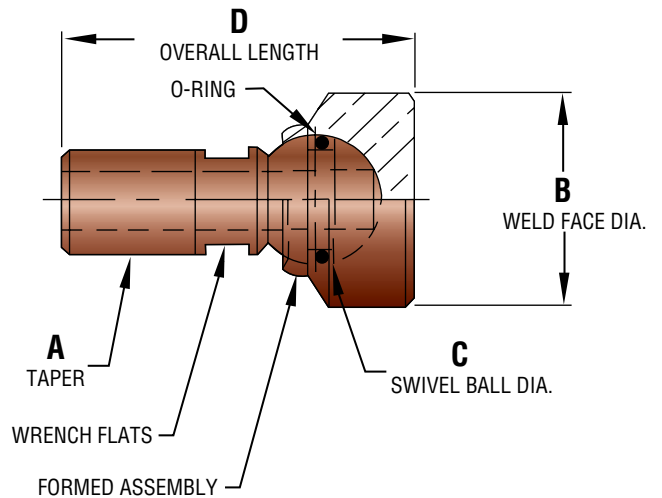
EXAMPLE:
 • SHEA25E10075200



(Material RWMA Class 2&3)

Thru Hole with O-Ring

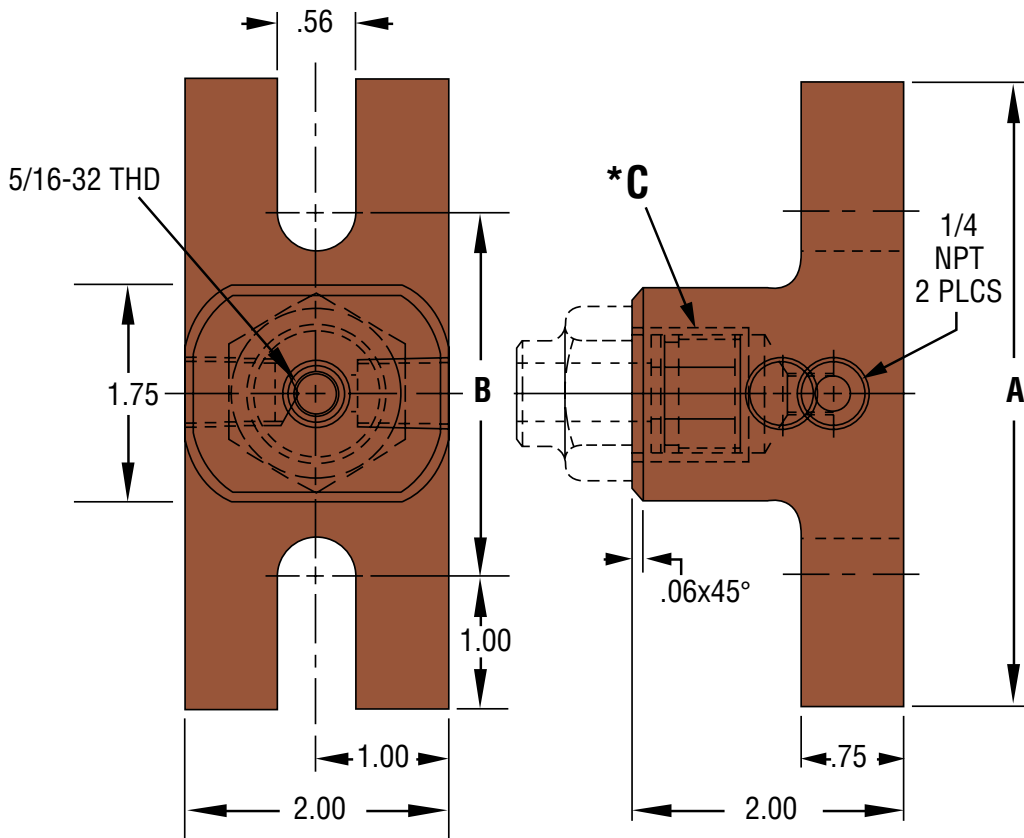
EXAMPLE:
 • SHEA025E10075200
 O-RING



(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	

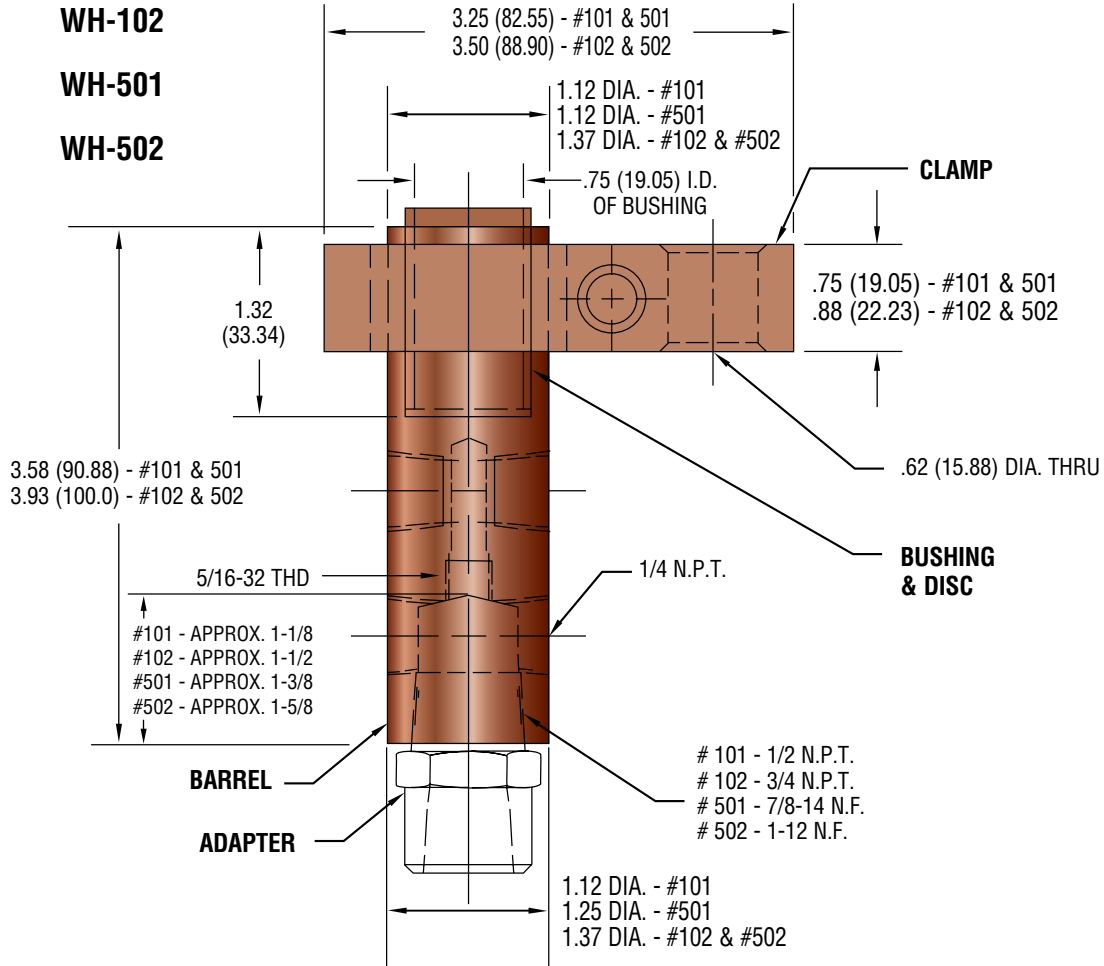
Cylinder Mounted Holders

ITEM NO. WH-101

WH-102

WH-501

WH-502



• Dimensions Shown Are: inches (mm).

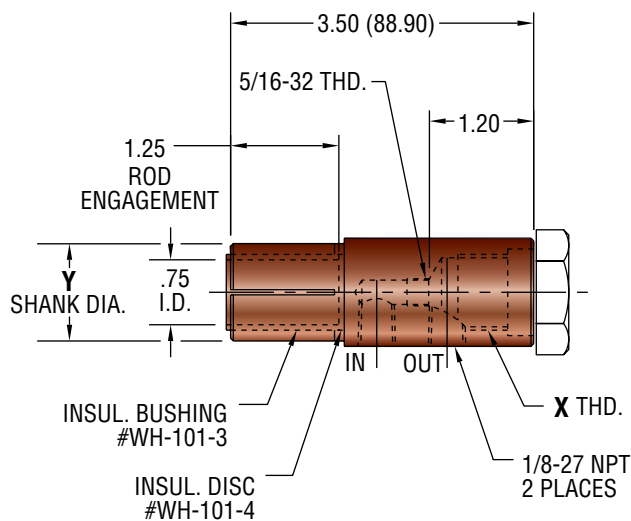
(Material - Copper)

101, 102, 501 & 502 SERIES HOLDERS

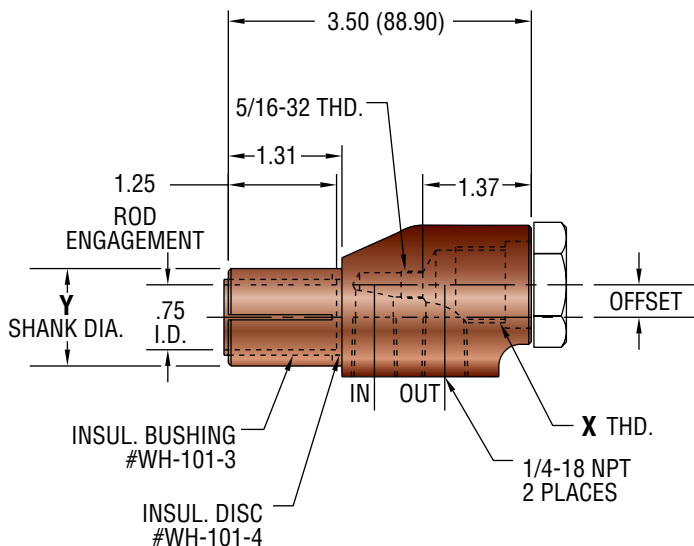
DETAILS	1/2 N.P.T.	3/4 N.P.T.	7/8-14 N.F.	1-12 N.F.
ASSEMBLY NO.*	WH-1010C	WH-1020C	WH-5010C	WH-5020C
BARREL	WH-101-1	WH-102-1	WH-501-1	WH-502-1
CLAMP NO.	WH-101-2	WH-102-2	WH-101-2	WH-102-2
BUSHING NO.	WH-101-3	WH-101-3	WH-101-3	WH-101-3
DISC NO.	WH-101-4	WH-101-4	WH-101-4	WH-101-4

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

Cylinder Mounted Holders

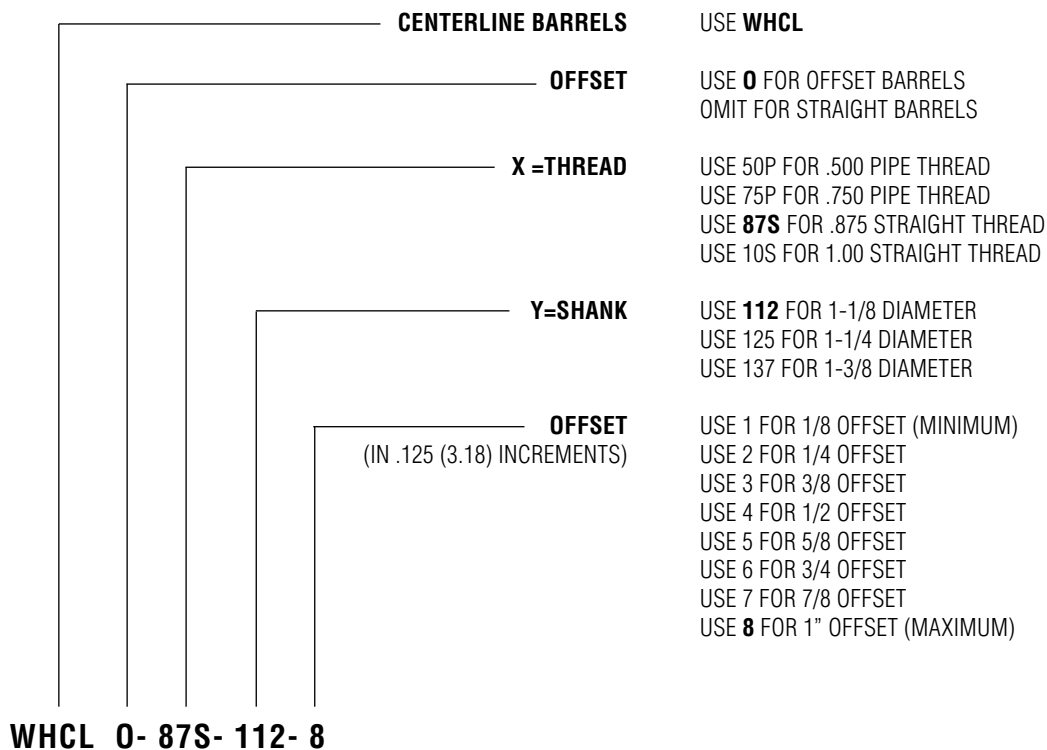


(Material RWMA Class 2)
Straight Barrel (WHCL Series)

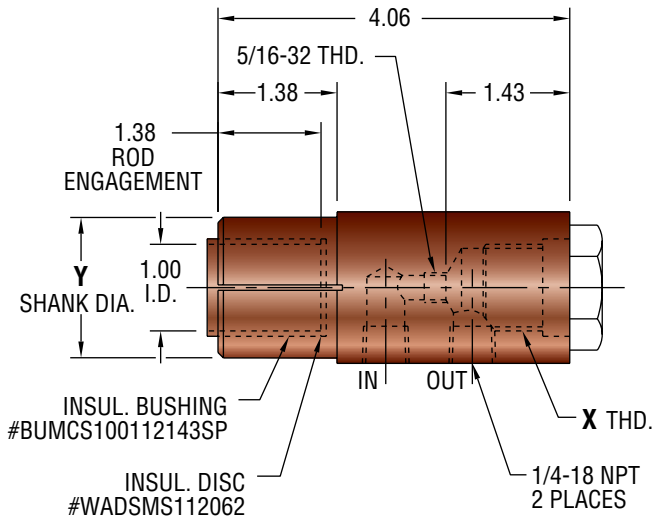


(Material RWMA Class 3)
Offset Barrel (WHCLO Series)

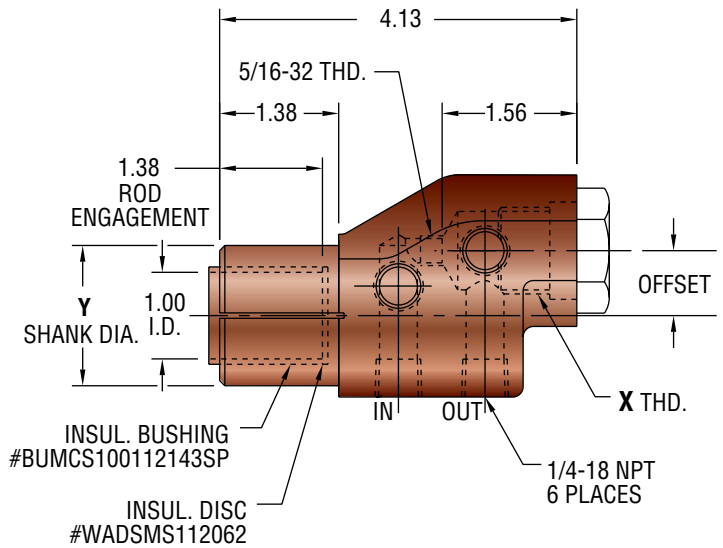
EXAMPLE EXPLANATION CODING



Heavy Duty Cylinder Mounted Holders

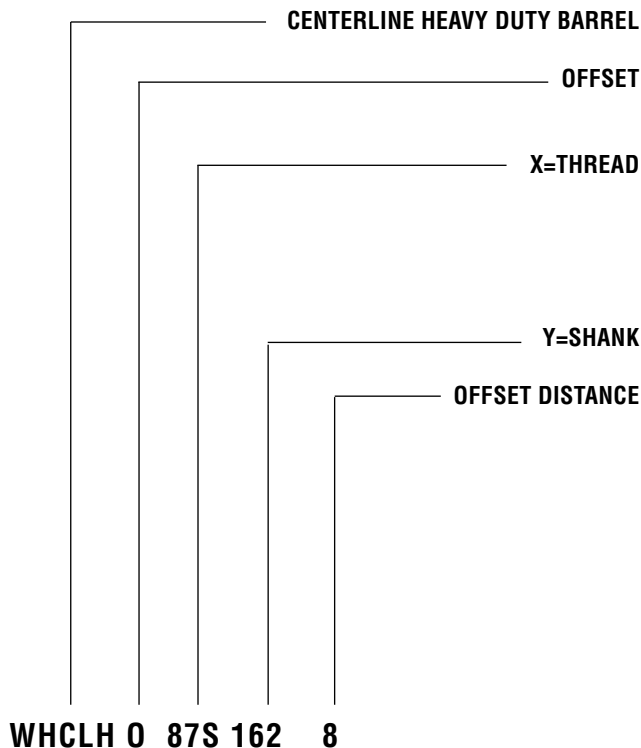


(Material RWMA Class 2)
HEAVY DUTY STRAIGHT BARREL
 (WHCLH Series)



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

EXAMPLE EXPLANATION CODING



USE **WHCLH**

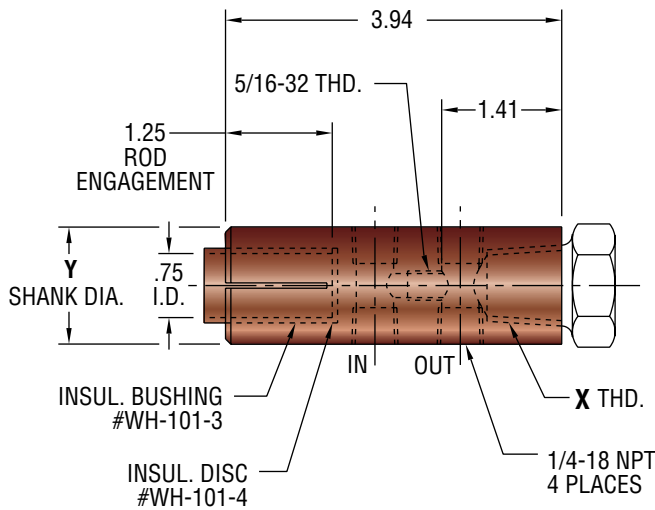
USE **0** FOR OFFSET BARRELS
 OMIT FOR STRAIGHT BARRELS

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

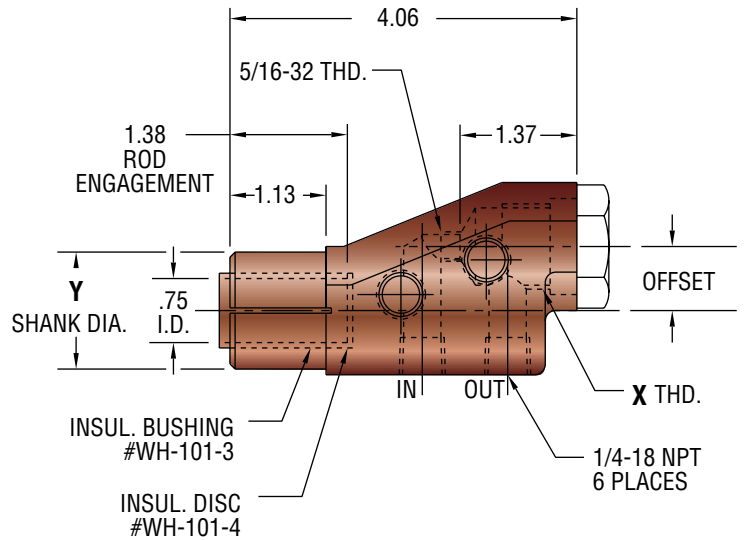
USE **162** FOR 1-5/8 DIAMETER

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

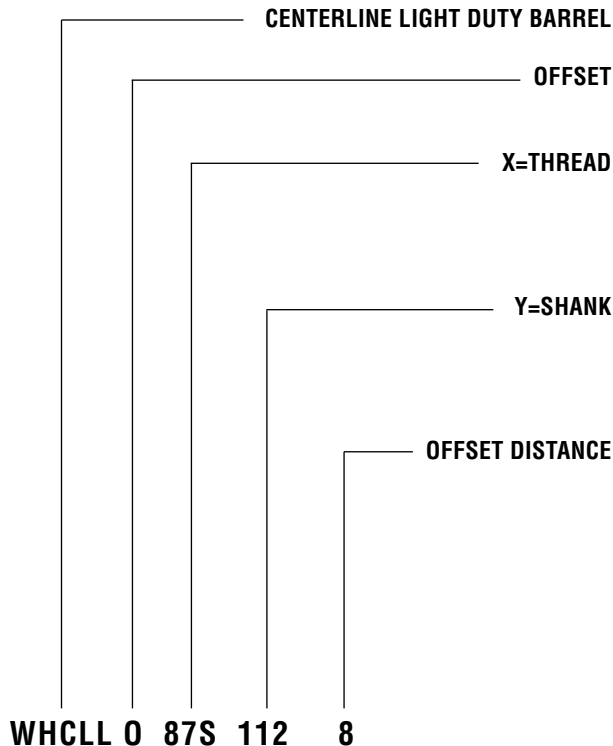


(Material RWMA Class 2)
LIGHT DUTY STRAIGHT BARREL
(WHCLL Series)



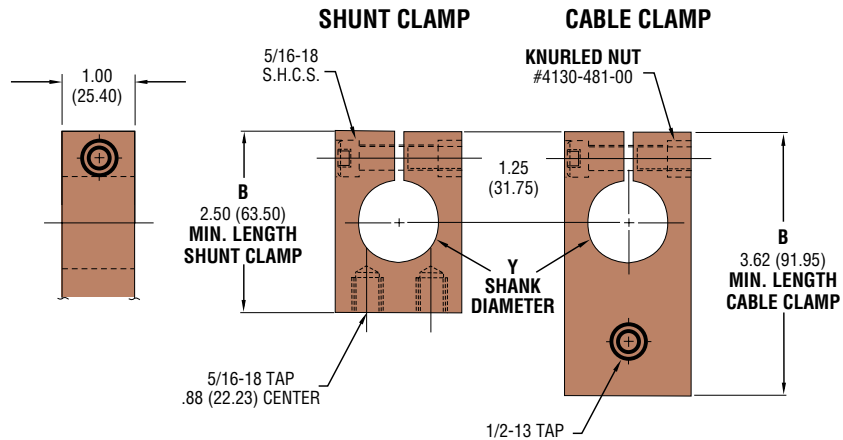
(Material RWMA Class 3)
LIGHT DUTY OFFSET BARREL
(WHCLLO Series)

EXAMPLE EXPLANATION CODING

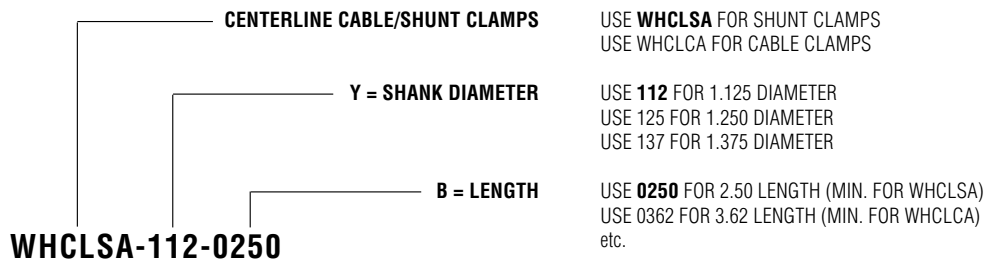


- USE **WHCLL**
- USE **0** FOR OFFSET BARRELS
OMIT FOR STRAIGHT BARRELS
- USE **50P** FOR .500 PIPE THREAD
USE **75P** FOR .750 PIPE THREAD
USE **87S** FOR .875 STRAIGHT THREAD
USE **10S** FOR 1.00 STRAIGHT THREAD
- USE **112** FOR 1-1/8 DIAMETER
USE **125** FOR 1-1/4 DIAMETER
USE **137** FOR 1-3/8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

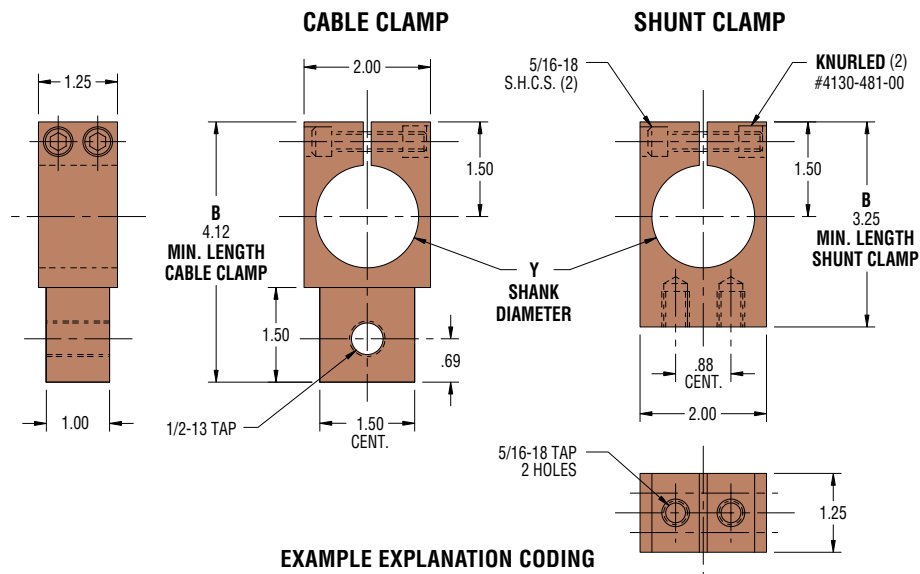
Light Duty Shunt/Cable Clamps



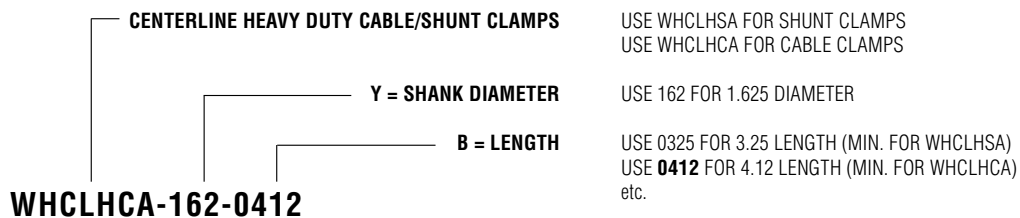
EXAMPLE EXPLANATION CODING



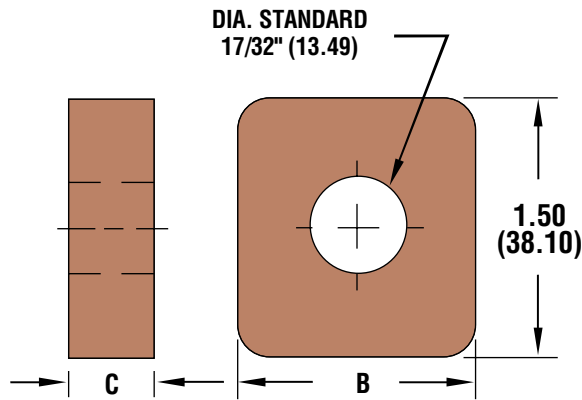
Heavy Duty Shunt/Cable Clamps



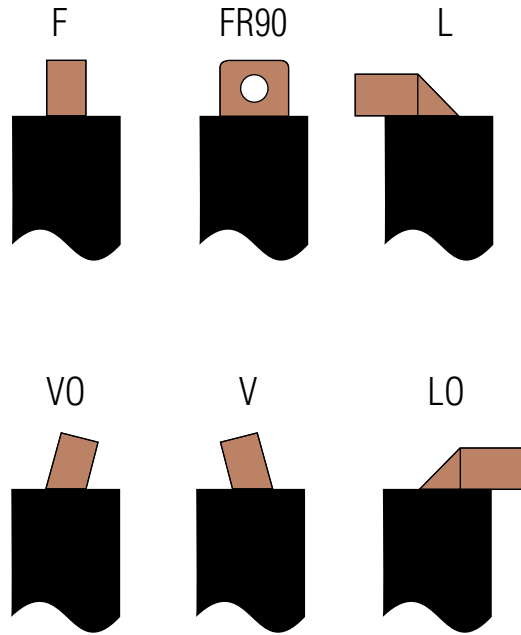
EXAMPLE EXPLANATION CODING



Air-Cooled Jumper Cables



END STYLES

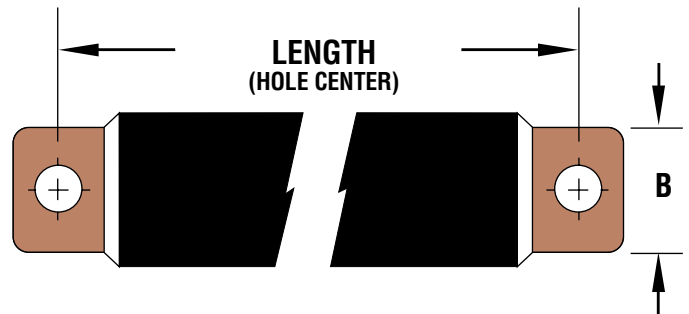


TERMINAL DIMENSIONS			
MCM	Jacket O.D.	B	C
600	1.63 (41.28)	1.38 (34.93)	.500 (12.70)
750	1.75 (44.45)	1.38 (34.93)	.600 (15.24)
1000	2.00 (50.80)	1.50 (38.10)	.700 (17.78)
1200	2.12 (53.98)	1.50 (38.10)	.820 (20.83)
1500	2.25 (57.15)	1.50 (38.10)	.990 (25.15)

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.
- The shunts are now available with a protective covering.

Contact CenterLine for assistance with selecting the appropriate shunt type.

Shunt Type & Dimensions

Specify inches or mm for all dimensions.

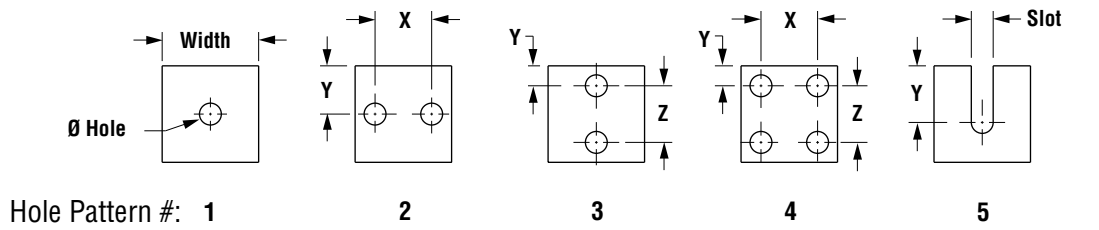
Select Shunt Type

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

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

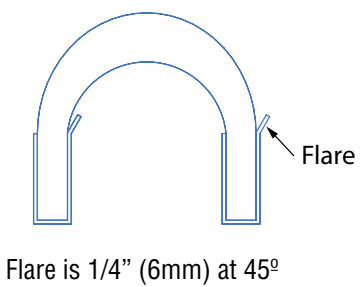
Clip Thickness

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

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

Shunt Insulation

Insulation required:

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

Provide any additional information or special instructions.

Water Tubes

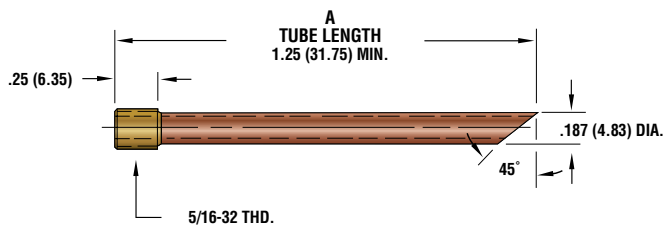
PART NUMBER CODING

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

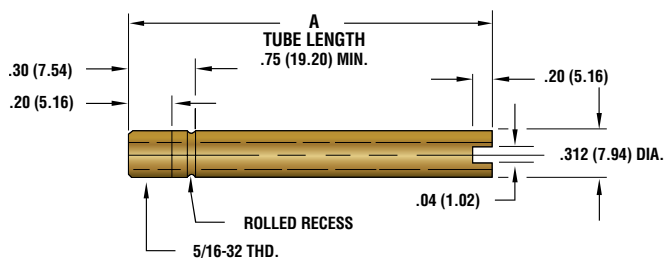
CLT - 1700 -12

Item No. _____ "A" Tube Length

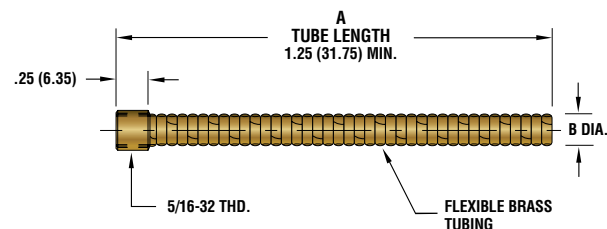
CLT-1500- TYPE "E" (Use with 4 RW Electrodes)
(Material - Copper & Brass)



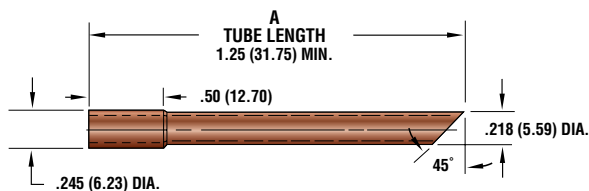
CLT-1000- TYPE "A" (Use with Telescoping Tubes Type "B" & "C")
(Material - 1/4 ID BRASS TUBE)



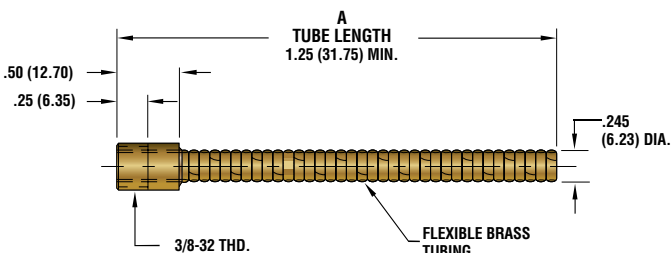
CLT-1600- TYPE "F" B = 0.210 (5.31) DIA.
CLT-1700- TYPE "G" B = 0.250 (6.35) DIA.
(Material - Interlocked Flexible Brass)



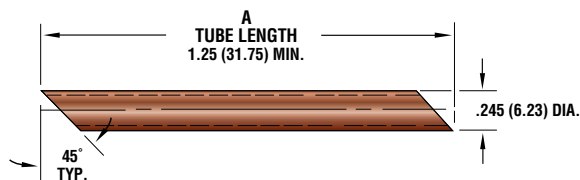
CLT-1200- TYPE "B" (Use with 4 RW Electrodes)
(Material - Copper)



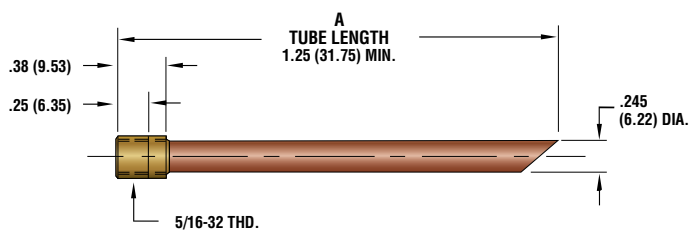
CLT-1800- TYPE "H"
(Material - Interlocked Flexible Brass)



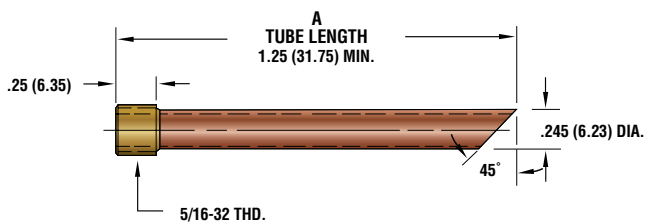
CLT-1300- TYPE "C" (Use with 5,6 & 7 RW Electrodes)
(Material - Copper)



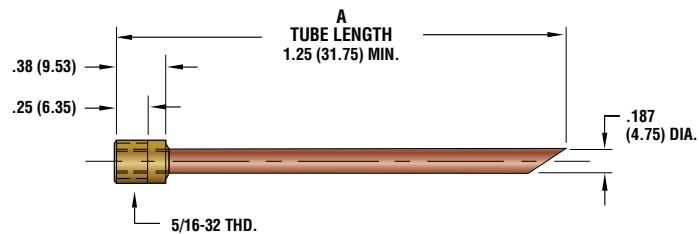
CLT-1900- TYPE "I" (Use with 5,6 & 7 RW Electrodes)
(Material - Copper & Brass)



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)

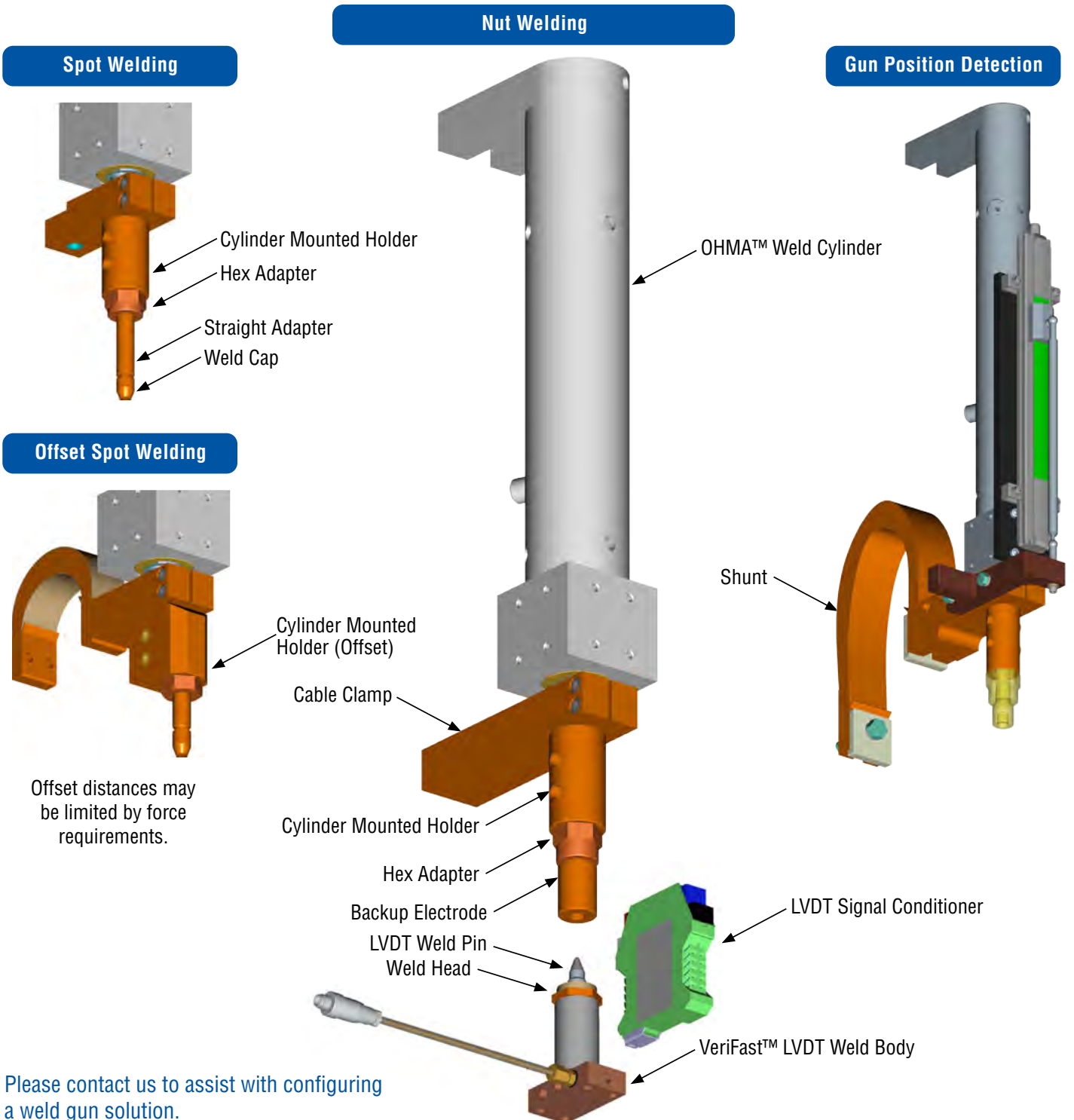


• Dimensions Shown Are: inches (mm).

CLWG Straight Acting Integration Kit

CLWG Straight Acting Integrator 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.



Please contact us to assist 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.

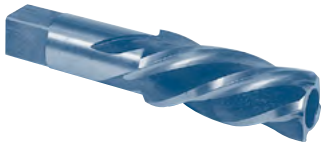
Special consumable products are available; contact us for your requirements.

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

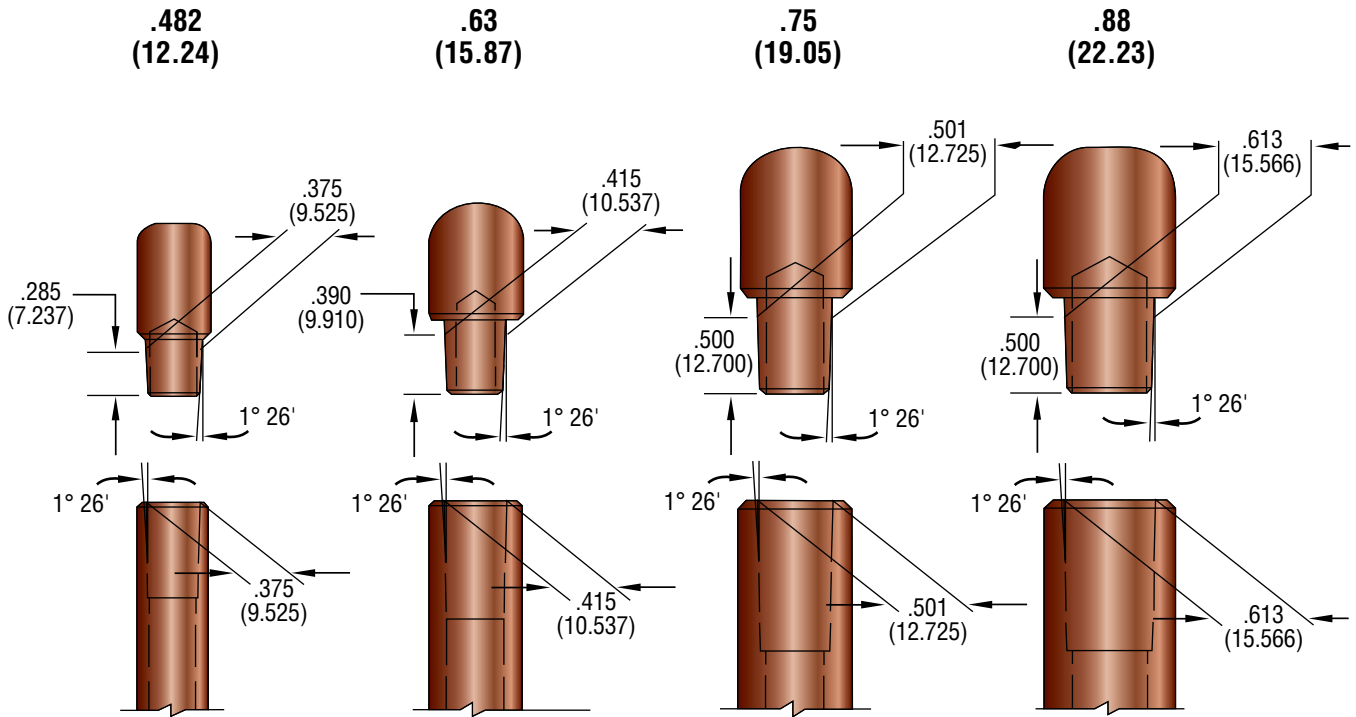
Use the CenterLine Cap Extractor for removing caps from shanks and die bodies.

PART NO.	DESCRIPTION
CLCX-250	Cap Extractor

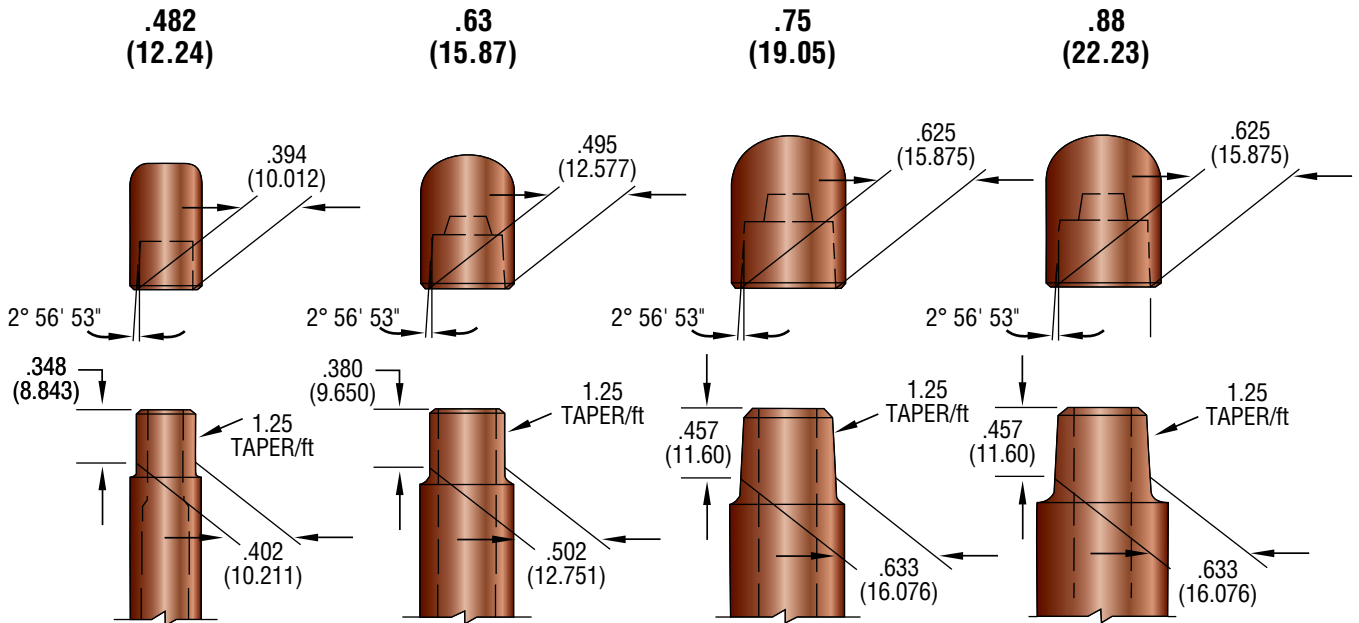


Reference Data

Male Cap Data



Female Cap Data



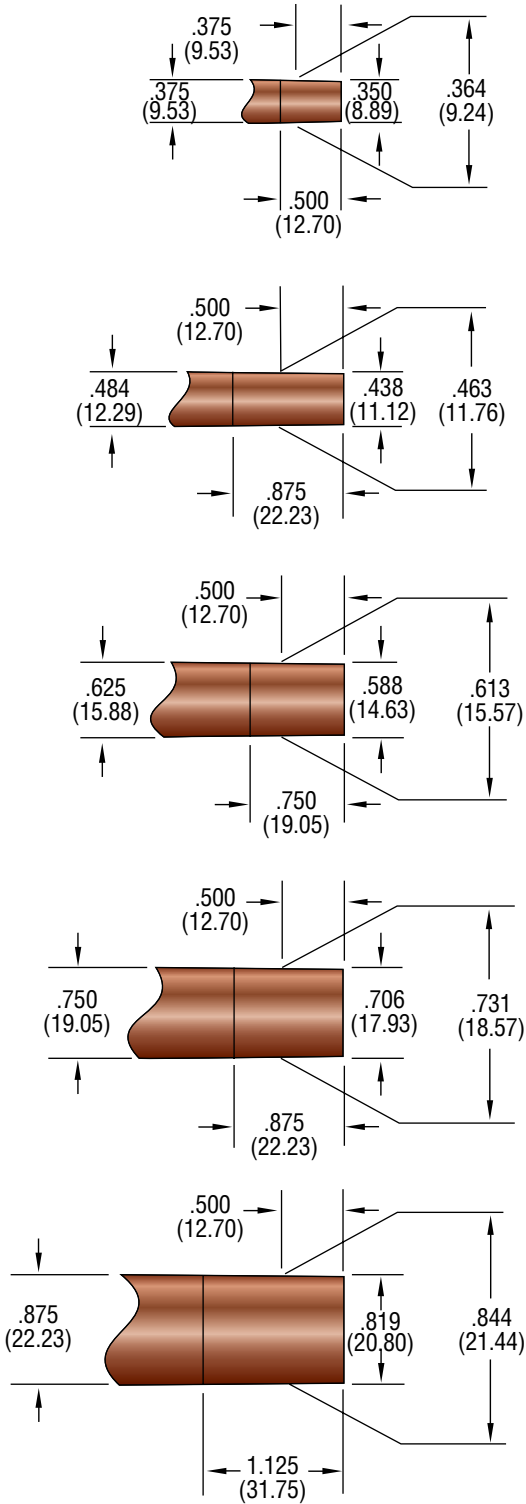
• Dimensions Shown Are: inches (mm).

Reference Data

Straight Female Adapters for Male Caps

ELECTRODE AND ADAPTER TAPERS

CAP TAPERS



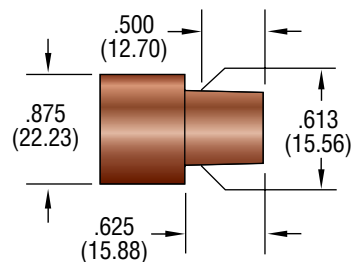
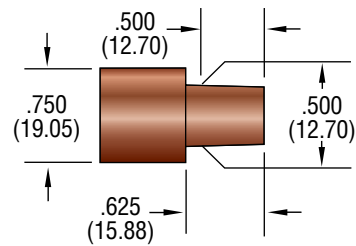
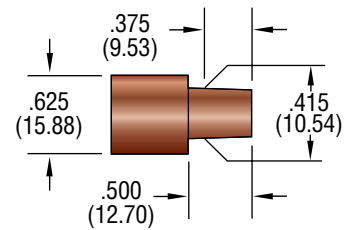
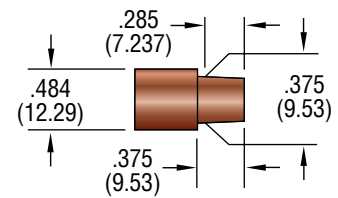
#0 MT - #3 RW

#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		
	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	B	2
	2		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		14				
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						
*AVAILABILITY CODING EXPLANATION <ul style="list-style-type: none"> • 1 = CASTING • 2 = FORGING • 3 = ROD & BAR • 4 = PLATE • 5 = TUBE • 6 = INSERTS 										
<ul style="list-style-type: none"> • GENERAL SUGGESTED APPLICATIONS, NOT TO BE INTERPRETED AS THE OPTIMUM FOR ANY SPECIFIC APPLICATION 										
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

CenterLine (Windsor) Limited, Electrodes Division, hereby provides to purchaser a limited warranty that its products and parts are manufactured free from defects in material and workmanship subject to the following *DISCLAIMERS of WARRANTIES*, limitations of liability, and *EXCLUSIVE REMEDY* provisions set forth below. Said warranty shall only be available to the original purchaser of the products or parts.

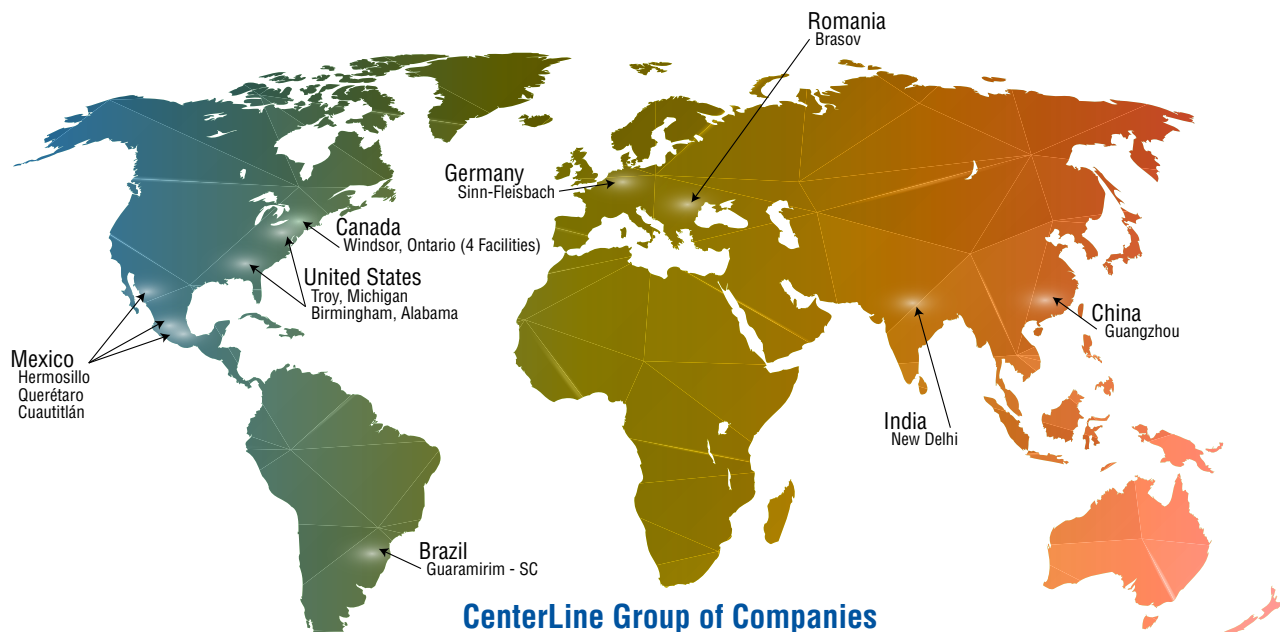
DISCLAIMERS OF WARRANTIES AND LIMITATIONS OF LIABILITY AND EXCLUSIVE REMEDY

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- B.** *Manufacturer disclaims any and all implied warranties and disclaims any and all warranties of merchantability and warranties of fitness for a particular purpose.*
- C.** The liability of manufacturer for a breach or violation of any warranty is limited to repair or replacement (at manufacturer's option) of the defective product or parts.
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- E.** Manufacturer shall not be liable or responsible for direct damages or for indirect damages or for incidental damages or for consequential damages or for the loss of the use of any asset or for the loss or revenue or for the loss of profit, anything in this agreement or in any other document to the contrary notwithstanding. The remedies set forth in this document are the sole and exclusive remedies available against manufacturer. All damages (including attorney fees and litigation costs) exceeding the purchase price of the products or parts are hereby expressly excluded and expressly disclaimed by the manufacturer.
- F.** Written notice of any defects in parts or products must be provided to manufacturer within one (1) year of the date of purchase by registered mail or certified mail, return receipt requested and any product or part believed to be defective must be returned to manufacturer's plant at purchaser's cost within said one (1) year. Any legal action based on any claim against manufacturer for breach of warranty must be commenced within one (1) year after date of purchase: otherwise, said claim shall be barred, void and unenforceable.
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The information in these Material Safety Data Sheets in this section was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use, and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with the handling, storage, use, or disposal of the product.

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

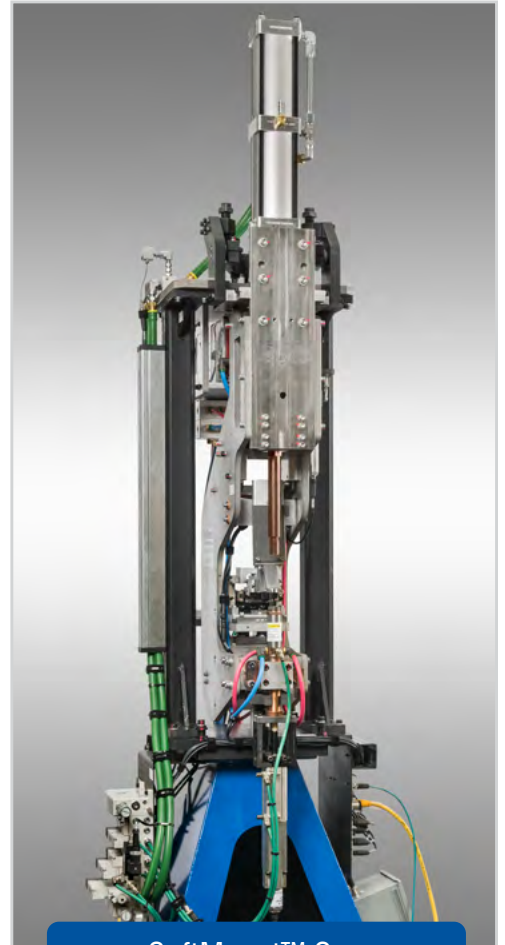
CenterLine Welding Products	Troy, MI USA	US sales office for CenterLine products and services; commodity management.
CenterLine SE USA Office	Birmingham, AL	Southern US sales and service office for CenterLine standard products.
CenterLine (Romania) Limited	Brasov, Romania	Engineering support center.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

Corporate Product Overview

Key Services

To effectively support operations and ensure our customers remain successful, CenterLine supplies a number of key services, including:

- Sales and Commodity Management Support
- Installation and Start-up Assistance
- Design and Engineering Support
- Full Project Management Assistance
- Machinery and Process Control Programming Support
- Preventative and Emergency Maintenance Support
- Process, Prototype, and Part Development (full metallurgical and welding lab facility)
- Rebuild and/or Re-use Assistance (to refurbish and redeploy existing equipment)
- Weld and Process Training (in-house and on-site)
- Equipment Wellness Audits
- Welding Process Development/Verification
- Detailed Technical and Operating Documentation



SoftMount™ Gun



KapTec™ Cap Maintenance



SST™ Cold Spray Systems



PinPoint™ Solution

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www.cntrline.com



Platinum member



415 Morton Dr.
Windsor ON
N9J 3T8



Telephone:
+1 519-734-8464
Fax:
+1 519-734-2000



E-mail:
info@cntrline.com