

FlexGun™ Welding Guns

Ver. 1.4



connecting needs with capabilities

FlexGun™ - The Standard for Welding Excellence

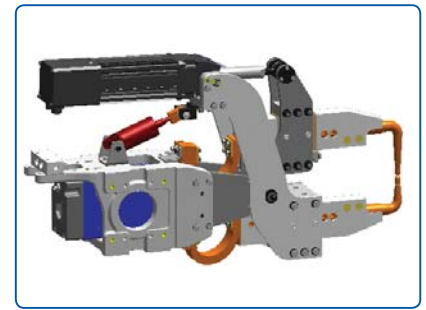
Resistance welding gun technology has advanced considerably since the introduction of transformer weld gun packages. As a pioneer in the development of transformer welding guns, CenterLine has introduced numerous welding advancements and continues to play a key role in welding gun developments.

Today, advanced manufacturing systems demand robotic welding guns that are adaptable to a wide range of application conditions while remaining **efficient**, **robust** and able to consistently produce **high quality welds**. CenterLine satisfies those needs with the FlexGun family of welding guns. This collection of weld gun designs reflect CenterLine's cumulative experience and expertise in resistance welding and provides manufacturers with one of the most practical and reliable collection of welding gun packages available today.

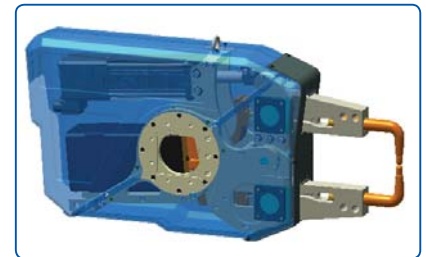
The FlexGun family includes the following design categories:

- ▶ FlexGun™ Standard
- ▶ FlexGun™ RA (Robotic Assembly)
- ▶ FlexGun™ UL (Ultra Light)
- ▶ CenterLine Nut Welding Guns

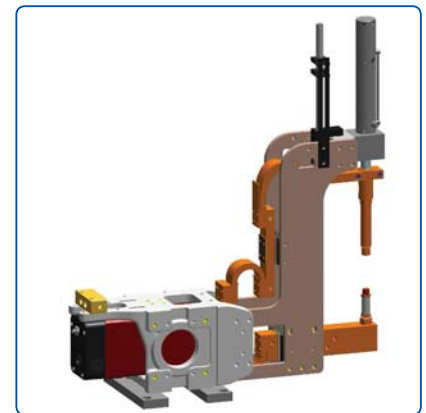
Collectively, this group of welding packages is suitable for nearly any spot welding or fastener welding application.



FlexGun™ Standard

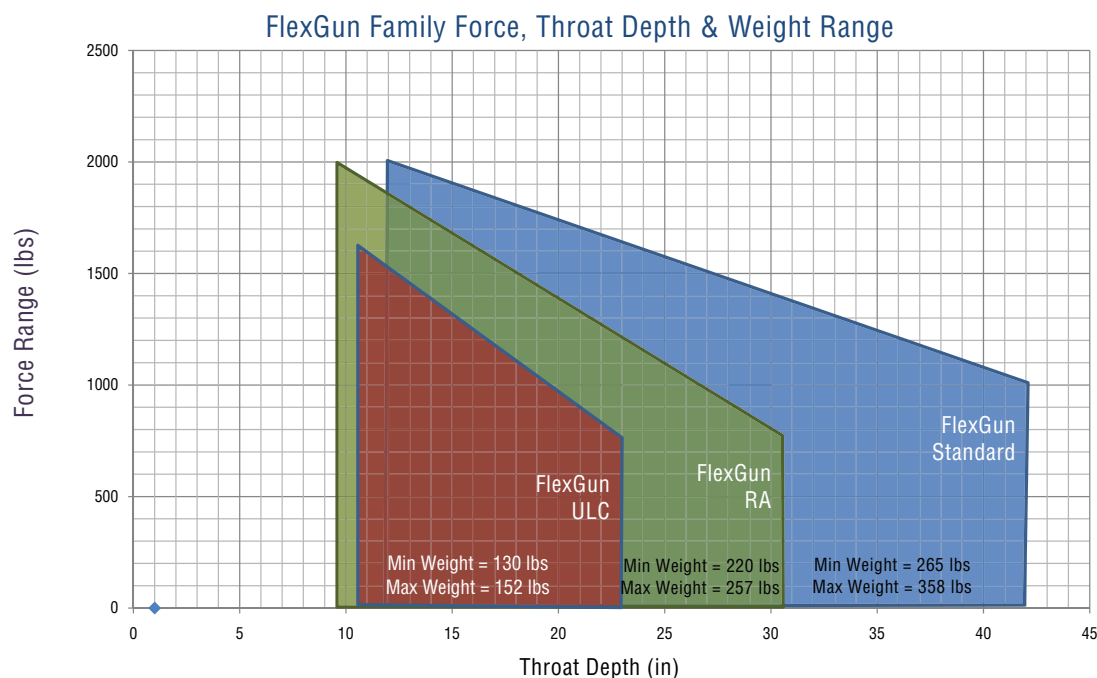


FlexGun™ RA



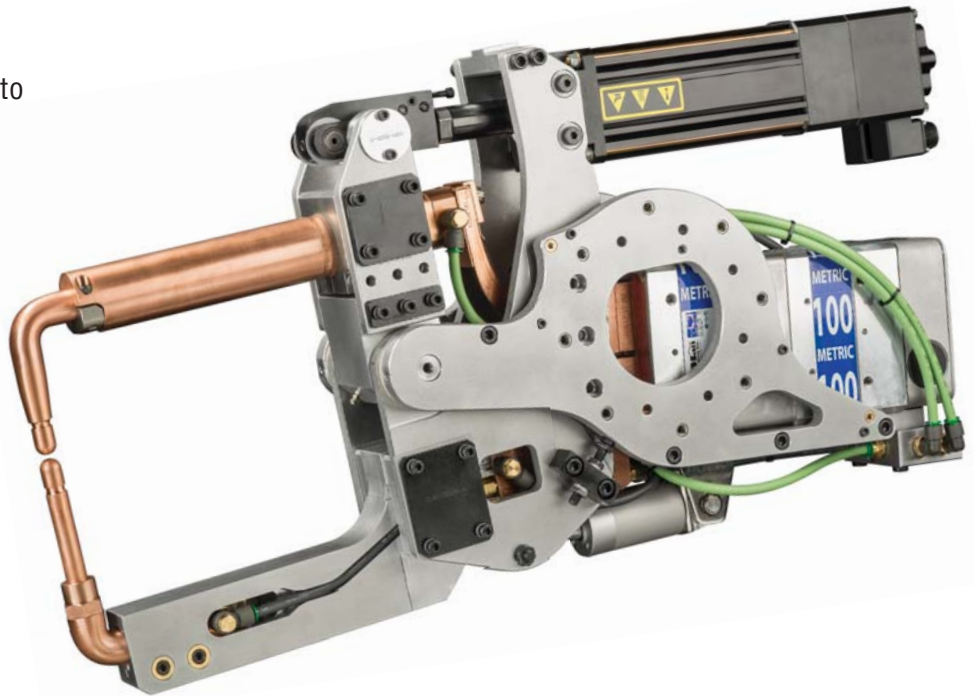
Nut Welding Gun

FlexGun™ Capability Comparison Chart



Common FlexGun Features

- ▶ **Practical designs** provide ease of access to main components to facilitate maintenance and replacement of worn components.
- ▶ **Optimal cooling** for improved transformer and electrode life and to allow for higher duty cycles.
- ▶ **Interchangeable actuators** – servo, pneumatic, air/oil intensification.
- ▶ **Common gun bodies** to minimize custom designs and improve delivery turnaround.
- ▶ **Modular design** for part interchangeability within each style.
- ▶ **Excellent strength** to gun weight ratio, enables packages to be used on lighter capacity robots.
- ▶ **Ease of modification** (arms, transformer, and actuators) for re-use on future programs.



FlexGun Design Range

Gun Family	Gun Type	Throat Depth Range in (mm)	Maximum Weld Force lbf (N)	Gun Mass lbs (kg)	kVA Transformer Range (AC /MFDC)
FlexGun™ RA	C-gun	1-17 (30-440)	<2000 (8900)	> 200 (90)	DC- 100-185
	Pinch	8-30 (200-760)	< 2000 (8900)	> 200 (90)	AC- 55-136
FlexGun™ Standard	C-gun	1.25-30 (30-760)	< 2000 (8900)	200-350 (91-160)	AC- 55-136 DC- 100-225
	Pinch	8-40 (200-965)	< 3000 (13350)	200-340 (91-155)	
	90° pinch	12-36 (305-915)	< 3000 (13350)	> 277 (125)	
Nut Welding	Bench	1-25 (25-610)	< 5000 (22250)	> 200 (90)	AC- 55-500 DC- 100-320

FlexGun™ Standard

Designed for :

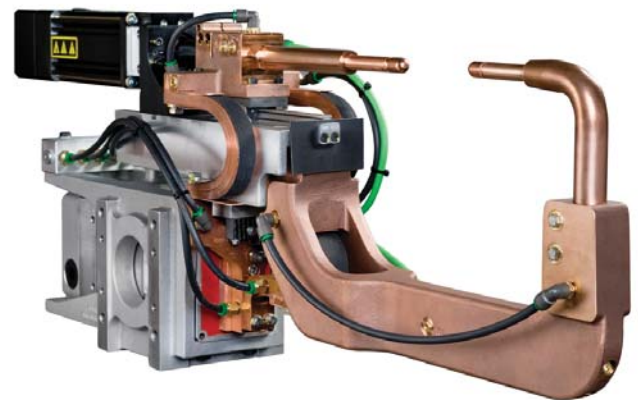
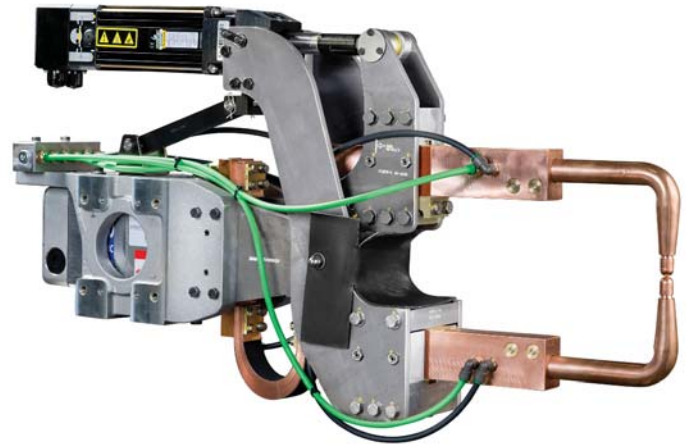
- ▶ High force weld conditions, typically 5,350 to 13,300 N (1200-3000 lbf)
- ▶ Suitable for robotic or stationary applications
- ▶ Interchangeable actuators - servo, pneumatic, air/oil
- ▶ Range of arm style construction options to satisfy specific weld force needs.
- ▶ Equalizing or non-equalizing options
- ▶ Accept transformers ranging from 55 to 136 KVA AC or 100-225 MFDC

Product Range:

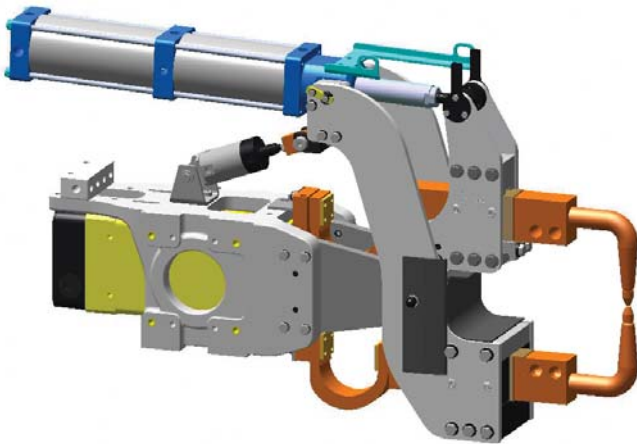
Gun Family	Gun Type	Throat Depth Range in (mm)	Force Range lbf (N)	Gun Mass Range lbs (kg)	kVA Transformer Range (AC /MFDC)
FlexGun™ Standard	C-gun	1.25-30 (30-760)	< 2000 (8900)	200-350 (91-160)	AC 55-136 DC 100-225
	Pinch	8-40 (200-965)	< 3000 (13350)	200-340 (91-155)	
	90° Pinch	12-36 (305-915)	< 3000 (13350)	> 277 (125)	

Main Features

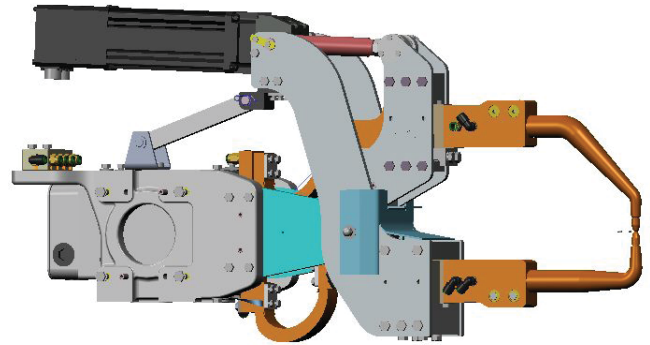
- ▶ Robust construction.
- ▶ Common sized modular body with optional arm designs.
- ▶ Modular body used for both equalizing & non-equalizing pinch guns.
- ▶ Unitized body cage design accommodates 55 to 136 KVA AC and 100-225 kVA MFDC transformers and facilitates transformer access and serviceability.
- ▶ Standard electrode consumables, valves, hosing and sensors can be incorporated to meet existing customer specifications.
- ▶ Common components across FlexGun family reduces stock level for spares.
- ▶ Optional stainless steel side plates for heavy duty applications requiring lower deflections.
- ▶ Wrought aluminum arms, copper arms and side plate design options offer superior strength-to-weight ratios.
- ▶ Easy to access shunts for quicker shunt replacement.
- ▶ Common actuator mounting for air/oil, pneumatic, or servo actuator options.
- ▶ Common robot mounting plate and bracket options for both Pinch and C-gun configurations.
- ▶ Existing library of proven gun designs.



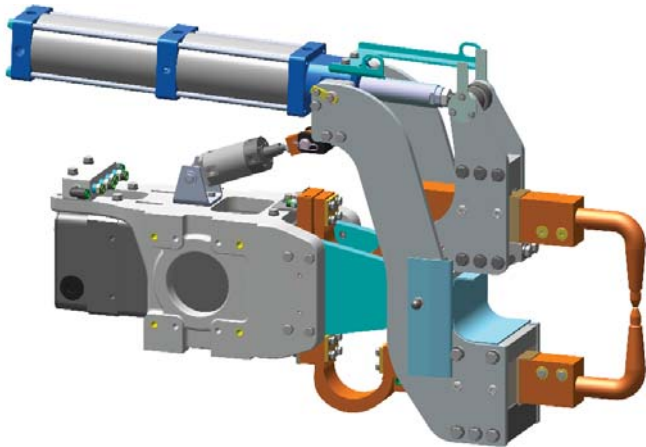
FlexGun™ Standard Design Examples



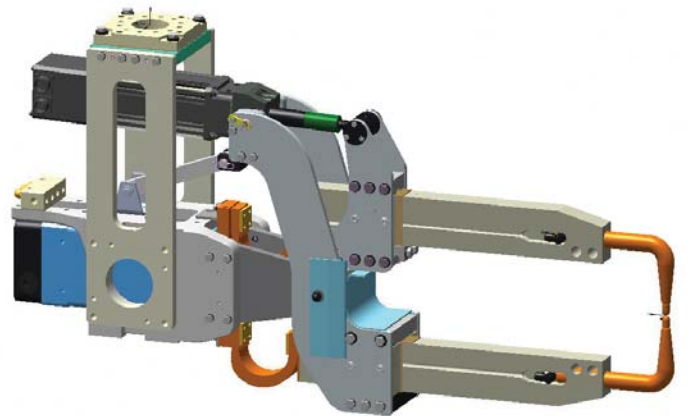
Pinch Style with Dual Piston Pneumatic Actuator
Model: 220-03216



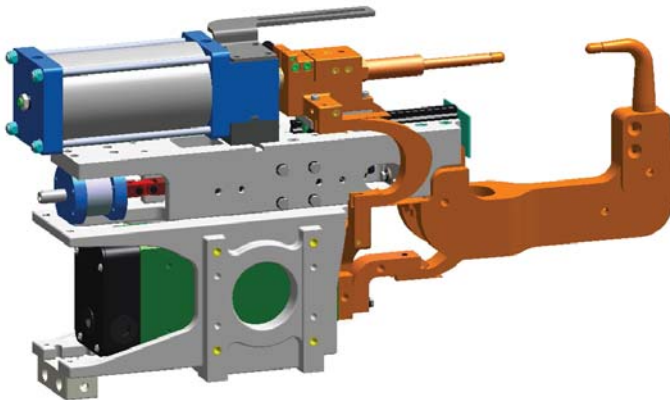
Pinch Style
Model: CFSPIN-020-060-059



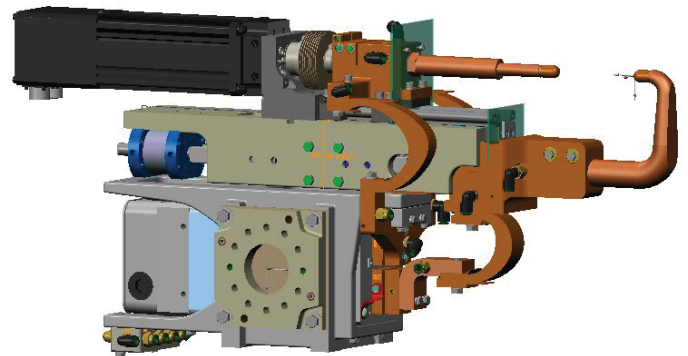
Pinch Style
Model: 220-06430



Pinch Style with Servo Actuator and Robot Bracket
Model: 220-04957



C Style with Pneumatic Actuator
Model: 220-03535



C Style with Servo Actuator
Model: 220-03216

FlexGun™ RA (Robotics Application)

Designed for:

- ▶ Robot mounted production assembly needs
- ▶ Medium to light gauge materials and automotive assembly welding forces and currents

Operating Range

Gun Family	Gun Type	Throat Depth Range in (mm)	Force Range lbf (N)	Gun Mass Range lbs (kg)	kVA Transformer Range (AC /MFDC)
FlexGun™ RA	C-gun	1-17 (30-440)	<2000 (8900)	> 200 (90)	AC-55-136 DC-100-185
	Pinch	8-30 (200-760)	< 2000 (8900)	> 200 (90)	

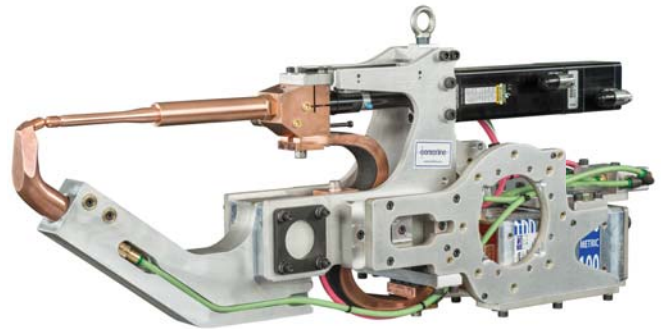
Main Features

- ▶ Fits on robots starting at 100 kg to reduce overall integration costs.
- ▶ Up to 2000 lbs (8896 N) electrode force.
- ▶ Variety of mounting positions (LH, RH, top, bottom, rear and 45 degree increments), without the need for custom hosing and service packages.
- ▶ Common bodies for both LH and RH versions and equalizing and non-equalizing configurations for true interchangeability and reduced consumable and spare parts inventories.
- ▶ Optional molded hard cover protects weld gun to reduce maintenance needs and extend operating life.
- ▶ Uses either 100-185 kVA MFDC or 55 to 136 kVA AC transformers to provide users with the most economical choice for their applications.
- ▶ Optimized for servo actuators; can also be used with pneumatic and air/oil actuators.
- ▶ Variety of arm choices (round copper, rectangular aluminum & rectangular copper) to best satisfy force and throat size needs. Decreases the number of base gun styles per program, gun delivery time and minimizes spare parts needs.
- ▶ Clean and practical design is easy to service.
- ▶ Minimal secondary connections to optimize electrical efficiency.
- ▶ Easily re-configured for use on new applications or to address part or process changes.
- ▶ Metric fasteners and fittings.

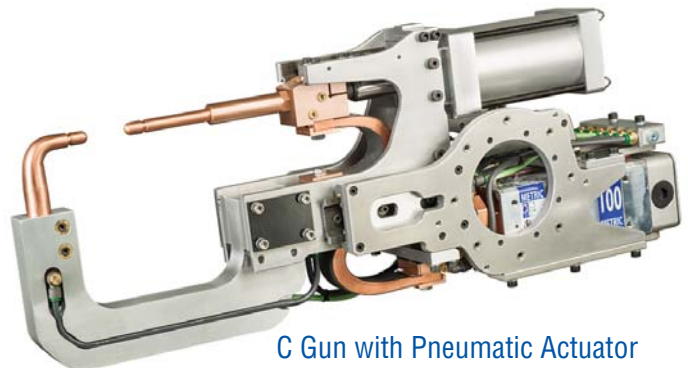


Transparent cover shown for illustration purposes only.

Pinch Gun with Optional Molded Gun Cover

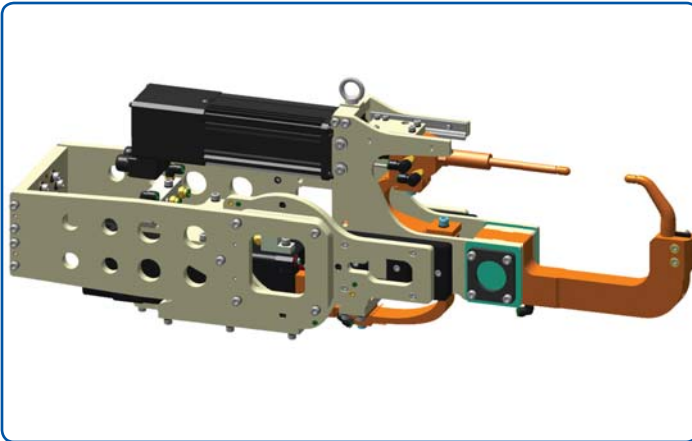


C Gun with Servo Actuator

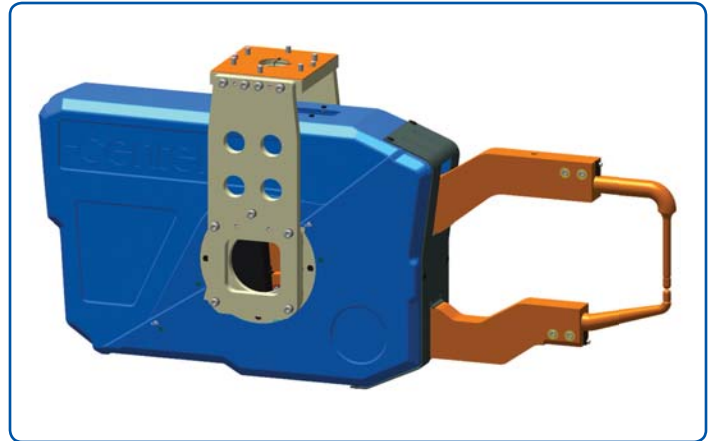


C Gun with Pneumatic Actuator

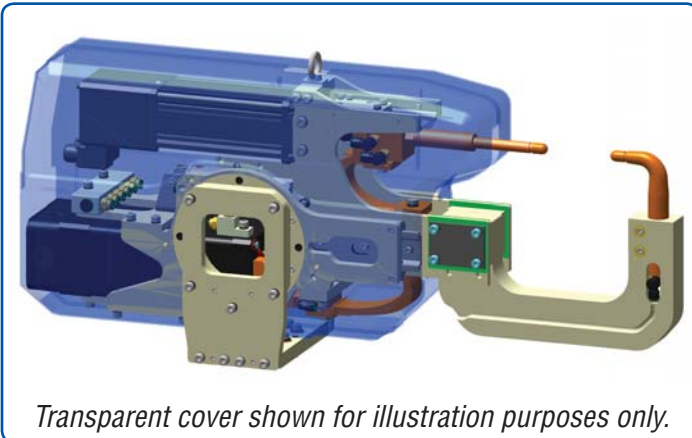
FlexGun™ RA (Robotic Application) Design Examples



FlexGun RA C Style - with Robot Bracket
Model: 220-06057

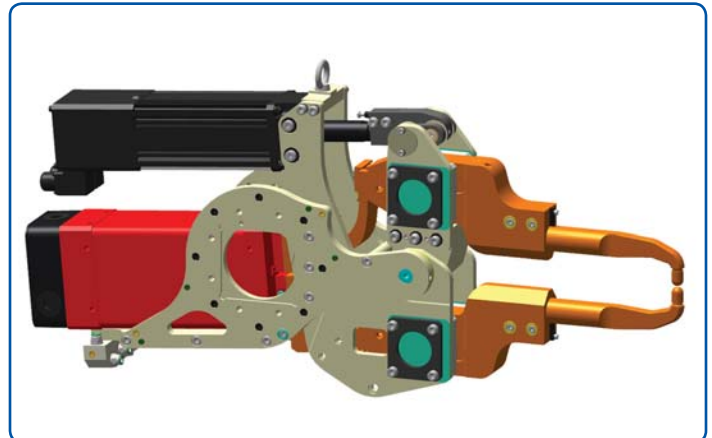


FlexGun RA Pinch Style - with Cover & Robot Bracket
Model: 220-06145

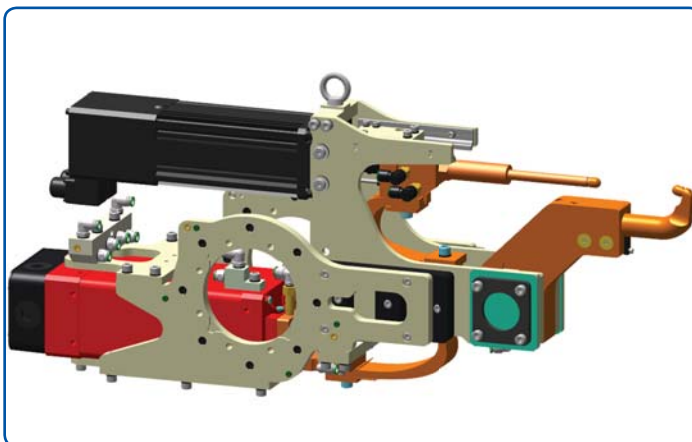


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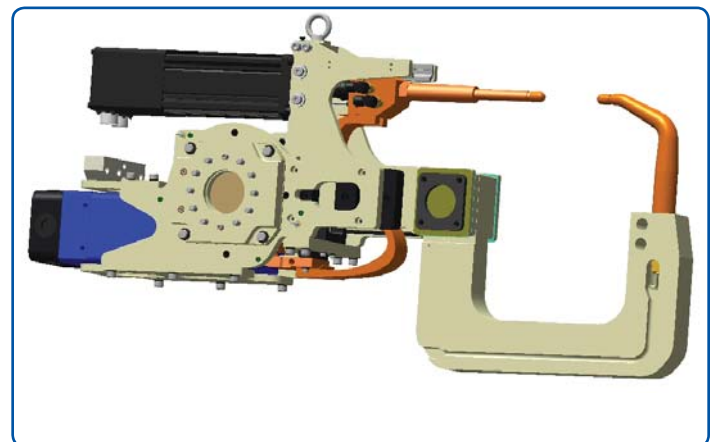
FlexGun RA C Style - with Cover and Robot Bracket
Model: 220-06210



FlexGun RA Pinch Style
Model: 220-06292



FlexGun RA C Style
Model: 220-06380



FlexGun RA C Style
Model: 220-06752

Nut Welding Guns

Designed for :

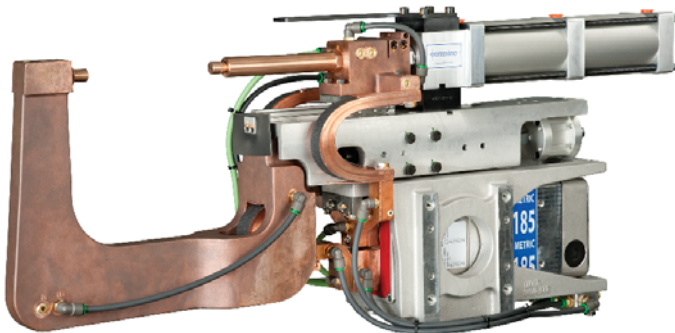
- ▶ Nut and stud welding applications.
- ▶ Fastener welding force needs with minimal deflection.
- ▶ Ideal for pedestal welding needs.

Product Range:

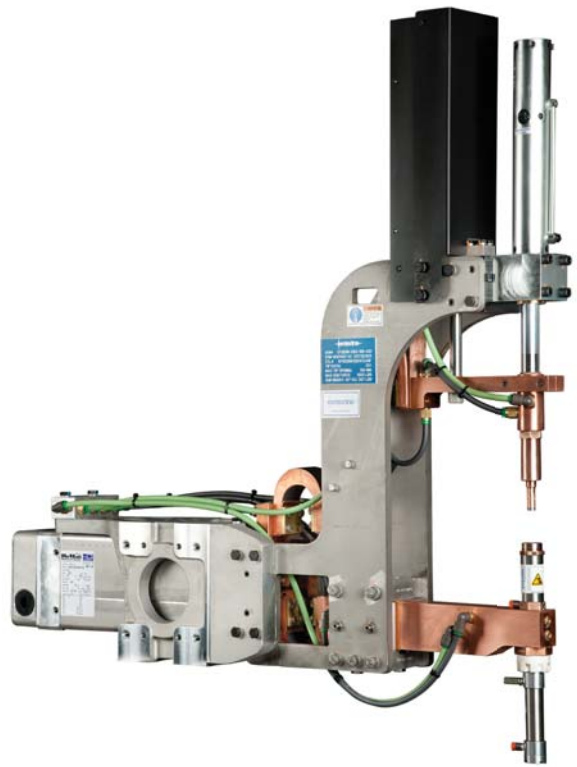
Gun Number #	Max. Weld Force N (lbs)	Max. Air Pressure Bar (psi)	Tip Ratio	Weight kg (lbs)	Throat Depth mm (in)	Total Tip Opening mm (in)	Actuator
CFOB9N-050-165-002	17700 (4000)	4.3 (63)	64:1	230 (505)	125 (5)	130 (5.3)	OHMA
CFAB9N-060-240-002	7100 (1600)	3.2 (47)	34:4	175 (381)	150 (6)	135 (5.5)	AIR
CFAB9N-075-185-001	11100 (2500)	5.3 (77)	32:1	230 (505)	190 (7.5)	145 (5.6)	AIR
CFOB9N-090-185-022	7500 (1700)	3.8 (55)	31:1	135 (287)	225 (9)	130 (5.3)	OHMA
CFOB9N-120-185-001	11100 (2500)	5.5 (80)	31:1	150 (327)	300 (12)	140 (5.6)	OHMA
CFAB9N-120-185-026	8000 (1800)	3.7 (53)	34:2	165 (363)	300 (12)	45 (1.8)	AIR
CFOB9N-140-185-001	8800 (2000)	6.5 (95)	21:1	150 (326)	355 (14)	130 (5.2)	OHMA
CFOB9N-240-215-001	6600 (1500)	4.9 (71)	21:1	210 (458)	605 (24)	200 (7.9)	OHMA

Main Features

- ▶ High electrical efficiency – minimal secondary connections
- ▶ Soft touch operation extends gun and electrode life and improves weld quality.
- ▶ Weld force maintenance throughout weld cycle to improve weld and part quality.
- ▶ Minimal deflection to prevent offset weld forces
- ▶ Small bore actuators reduce air consumption
- ▶ Gun bodies not directly mounted to transformer pads to eliminate potential transformer mechanical damage.
- ▶ Easy access to all gun components for service and maintenance needs.

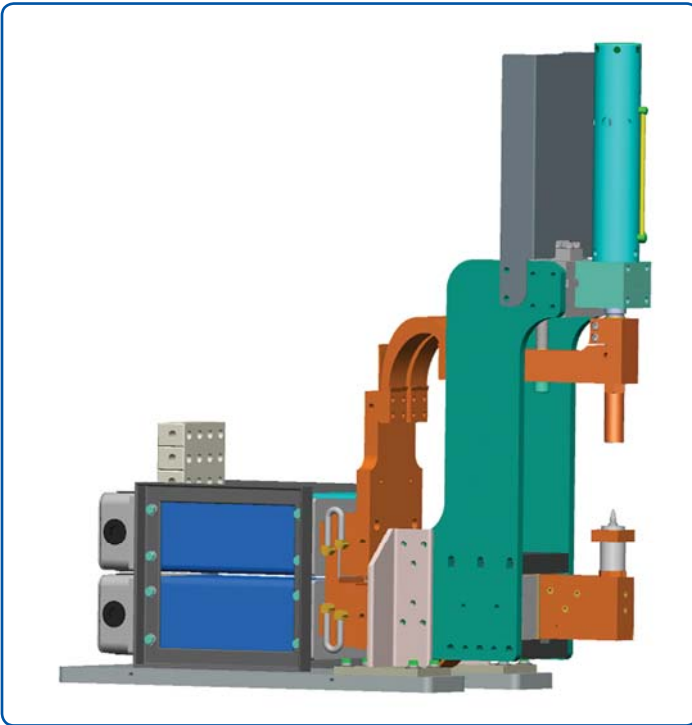


Pedestal/Robot Mounted Nut Welding Gun - Cast Design

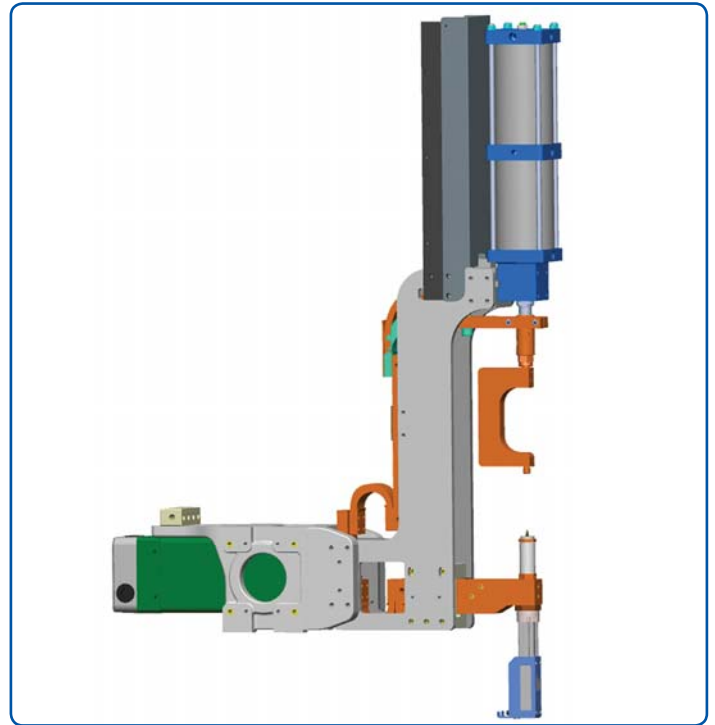


Bench Mounted Nut Welding Gun

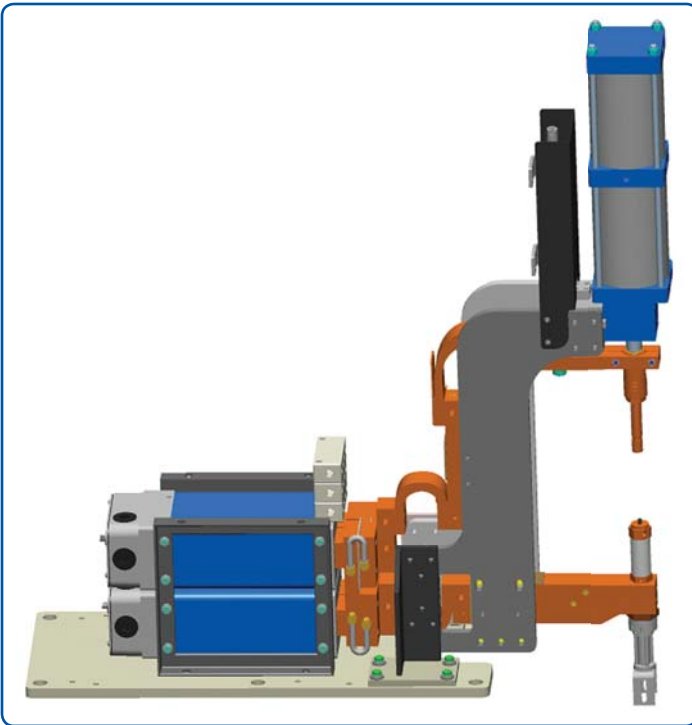
Nut Welding Gun Designs



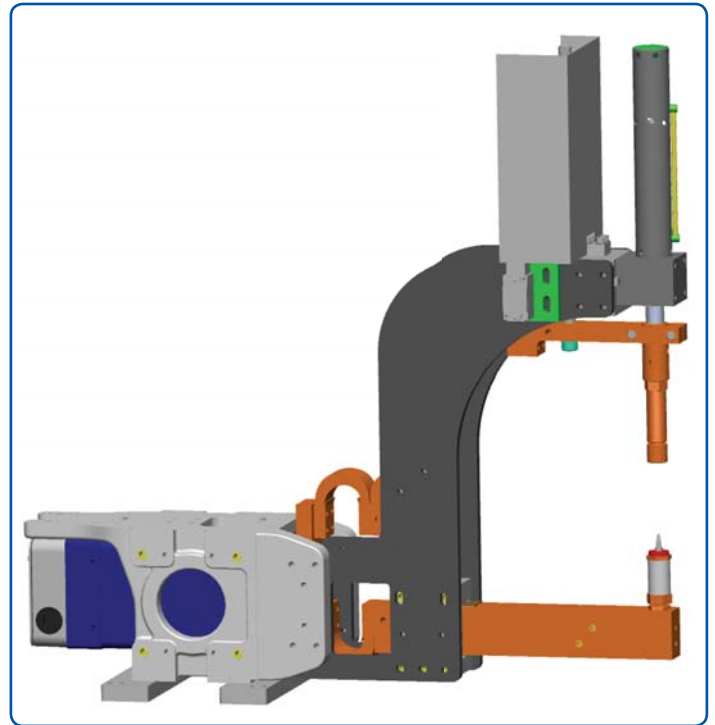
Dual Transformer
Model: CFOB9N-050-165-002



Pneumatic Actuator and VeriFast™ Laser Detection
Model: CFAB9N-060-240-002



Dual Transformer with Pin Return Detection
Model: CFAB9N-075-185-001



OHMA® Air/Oil Actuator and Stroke Detection
Model: CFOB9N-120-185-001

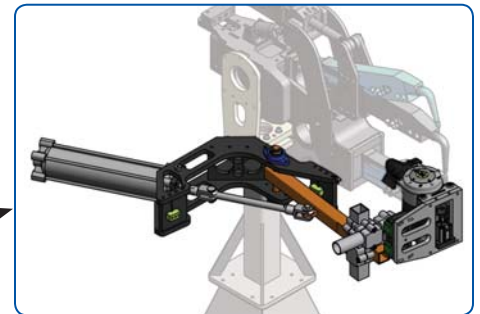
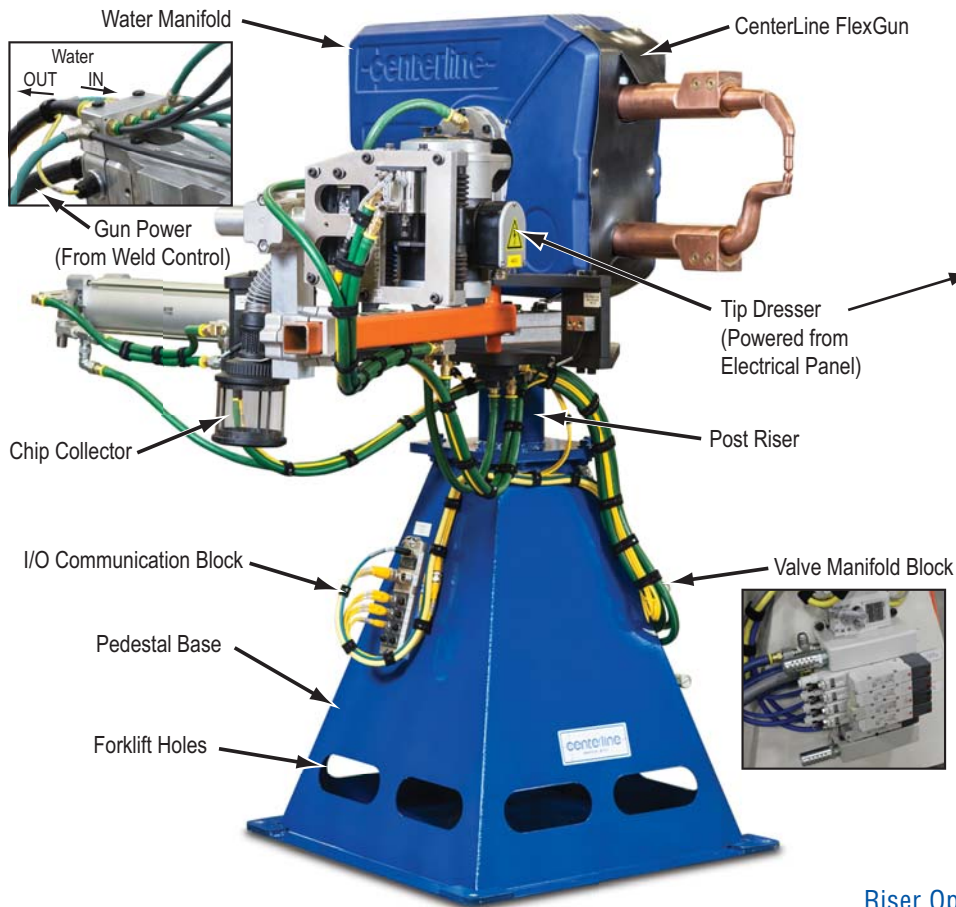
Simplify Welding Cell Design and Manufacture

CenterLine's PedTec™ Weld Gun Accessories Stands are a series of pre-engineered components that can be easily assembled to create a wide range of robust weld gun mounting pedestals.

These standardized modular and economical building blocks are designed to reduce lead times and to accommodate CenterLine's family of welding gun styles, as well as a number of other components such as tip dressers, cap changers, fastener sensors (VeriFast™ units) and feeders.

PedTec™ WG750 System

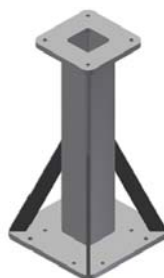
Shown with FlexGun™ and Tip Dresser



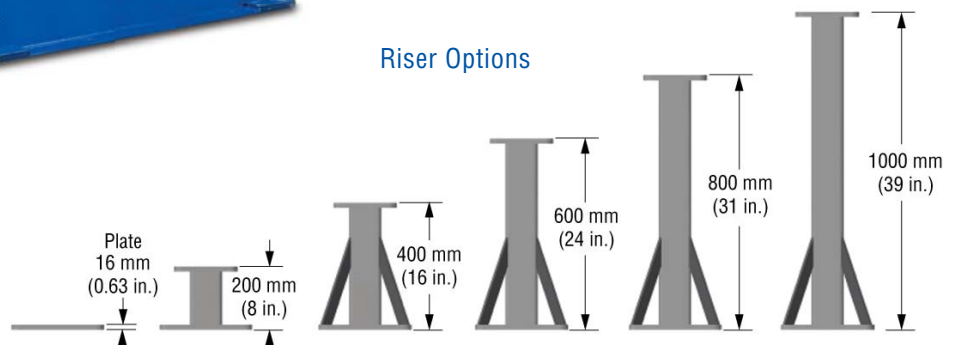
Tip Dressers

- ▶ Tip Dresser accessory available as a modular bolt-on assembly.
- ▶ Up to 120° opening angle for robot clearance.
- ▶ Cap electrode dress cutters available for 5/8" and 3/4" electrodes including a variety of cap face geometries.

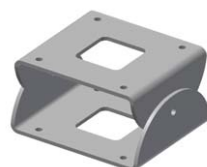
Post Riser



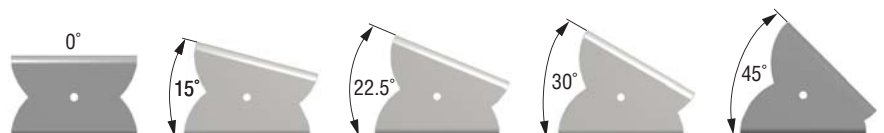
Riser Options



Clevis Bracket



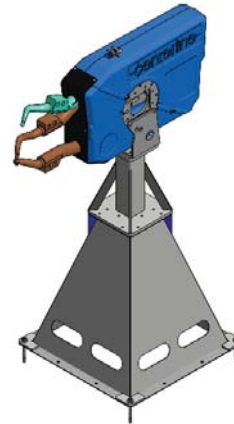
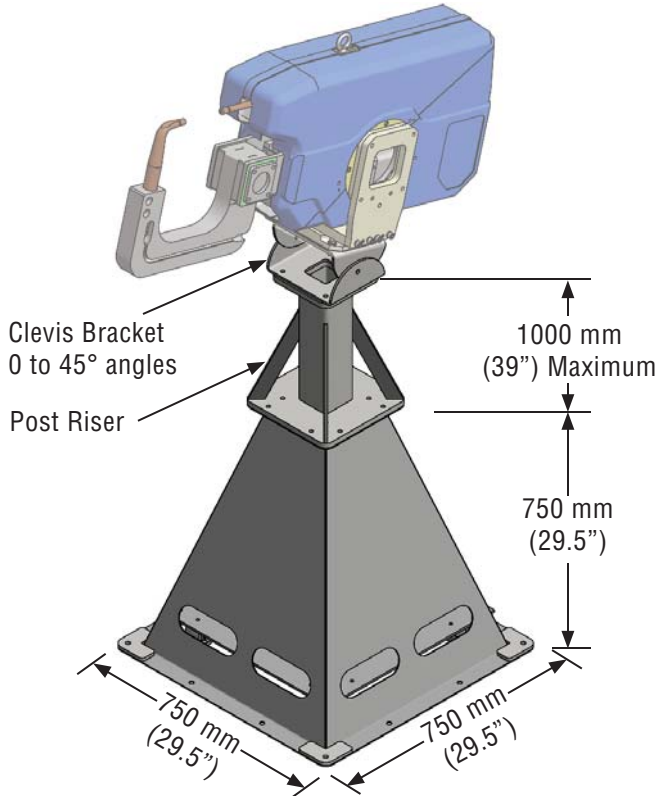
Clevis Bracket Options



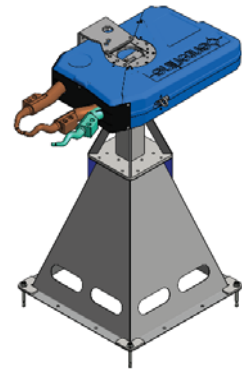
Customization Options

The PedTec is designed to accommodate various weld gun styles. The clevis & post risers allow for mounting weld guns at angles ranging from 0 to 45° and heights ranging up to 1000 mm.

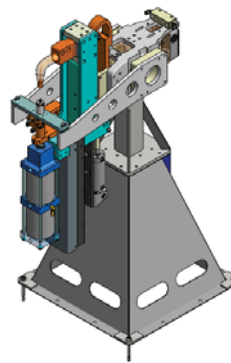
C Gun-Vertical Position with Tilted Clevis Bracket



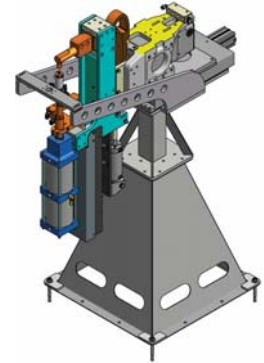
Pinch Gun-Vertical



Pinch Gun-Horizontal

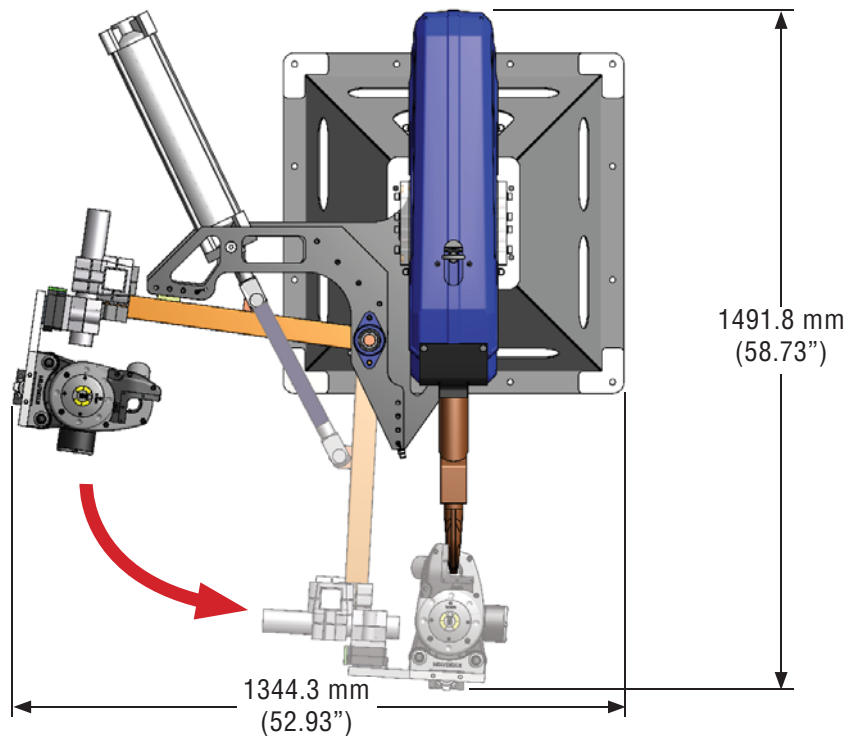


C Style Bench Gun



C Style Bench Gun with Slide

Footprint Example



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- ▶ Roll Spot Welders - SeamTec™
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- ▶ Piercing Cylinders & Presses
- ▶ Cold Spray - SST™ Equipment & Supplies



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