

FlexGun™ UL

Ultra Lightweight Welding Gun

Ver. 1.3



FlexGun UL

Ultra light for Floor Space & Capital Cost Savings

DELIVERS:

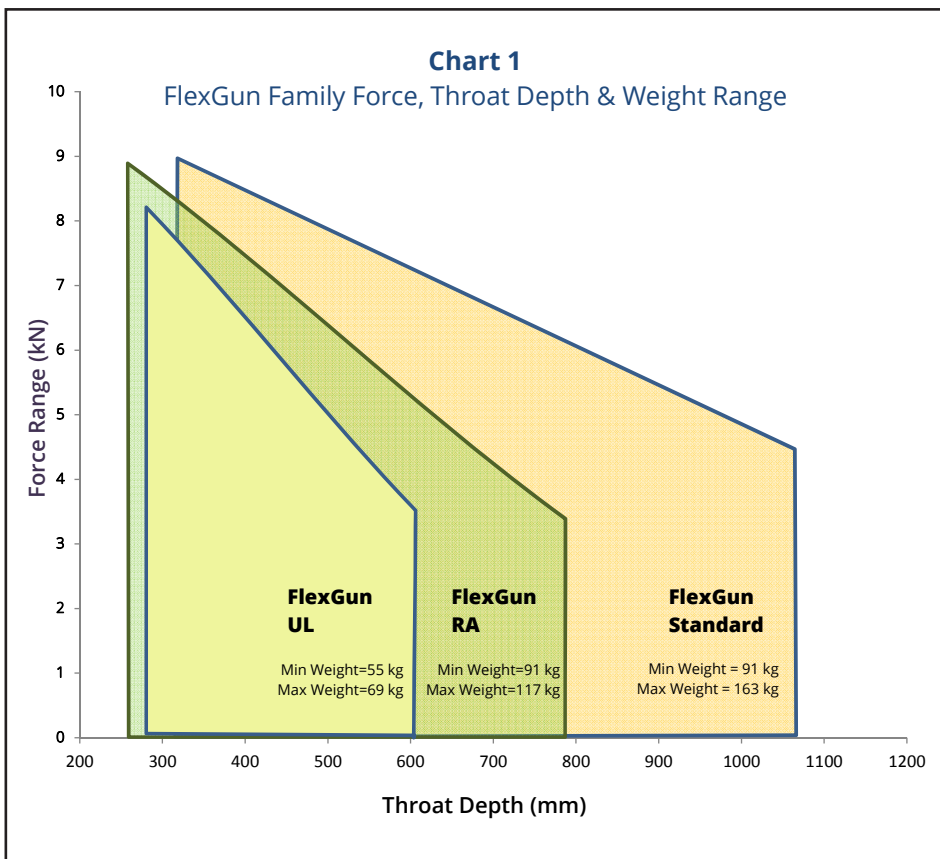
- Cycle time savings
- Floor space savings
- Increased “robot density”
- Lower gun mass
- Symmetrical design
- Industry leading life expectancy

The FlexGun™ UL is an ultra lightweight weld gun that is part of CenterLine's FlexGun family of gun packages. With nearly 100 available models in **X, C and Pinch** configurations, and a vast majority of models with total **gun mass under 70kg**, the FlexGun UL is ideal for use on robot models with payloads starting at 80kg and for applications requiring between 2.5 to 8.3 kN of weld force.

With **integrated robot mounting, superior strength to weight ratio**

construction, compact size and true symmetrical design, the FlexGun UL is the right choice for high density production needs.

The FlexGun family of welding gun packages also includes the series RA (Robotics Assembly) and the Standard series. Collectively, CenterLine's modular welding guns can satisfy nearly any automated production resistance welding application (Chart 1).



NOTE: The FlexGun™ UL gun is not designed to accommodate the mounting of additional components (i.e. grippers, tooling, etc.) to its frame.

Applications requiring the use of additional process components on robots fitted with a FlexGun™ UL welding gun must be attached directly to the robot mounting flange.

Note: Weight ranges for servo guns with standard options & configurations. For illustrative purposes only, contact CenterLine to obtain specific welding gun capabilities by model and available options.

Best in Class Features

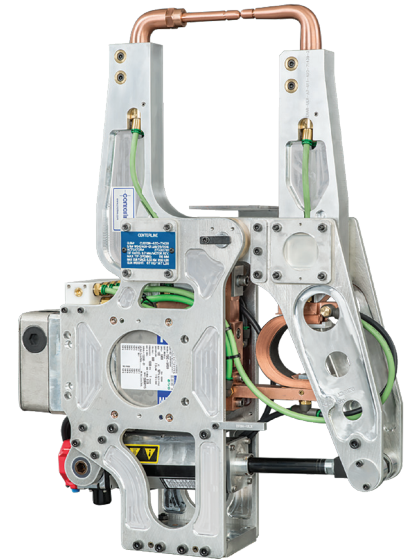
The FlexGun UL design provides an extensive list of capabilities making it one of the most versatile and reliable gun designs in the industry.

Gun Assembly	X Style	C Style	Pinch Style
Throat Range (mm)	From 50 H x 300 D to 300 H x 600 D	From 50 D x 320 L to 400 D x 400 L	From 50 H x 300 D to 300 H x 600 D
Mass Range (kg)	56.5 to 68.2	55.1 to 66.0	56.2 to 69.2
Max Force, 5mm Pitch Servo (N)	8330*	7000*	7660
Max Force, 10mm Pitch Servo (N)	7210	5800	NA
Robot Mounting (see information below)	3 way, integrated	5 way, integrated	4 way, integrated

* Maximum force limited by lightweight gun body structure.

Servo Actuator	
Rated Life	20 million cycles (to maintenance)
Mechanical Lead Type	Roller Screw
Max Output with 5mm Pitch	8500 N
Max Output with 10mm Pitch	5800 N
5mm Pitch Speed @ 3500 RPM	292 mm/s
10mm Pitch Speed @ 3000 RPM	584 mm/s
Lubrication Requirements	None, pre-lubed for rated life
Application of 5mm Pitch Actuator	C, Pinch or X
Application of 10mm Pitch Actuator	C, Pinch or X
Max Duty Cycle	up to 25% **
IP Rating - Sealing Effectiveness Against Contaminants & Moisture	IP65
Output Accuracy	Within +/- 3%
Mounting	Trunnion
Interchangeability between X,P and C guns	YES

Refer to the **Welds Per Minute vs Material Charts.

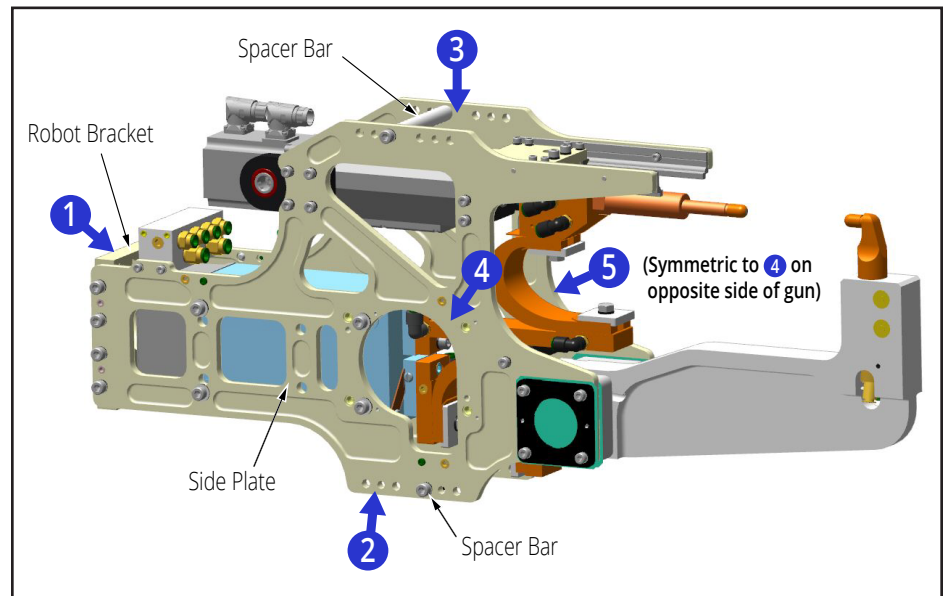


Robot Mounting Locations

A Robot Bracket is included for use in mounting the FlexGun UL to a robot. Depending on the gun style, up to five (5) mounting locations and/or orientations are possible. To maintain the gun's structure and stability, Spacer Bars are installed at some locations.

- X Gun - 3 Locations
- C Gun - 5 Locations (as shown)
- Pinch Gun - 4 Locations

Contact CenterLine for additional robot mounting details and features.



C Gun - 5 Possible Robot Bracket Locations

The FlexGun UL series is designed in X, C and Pinch configurations. The following Weldgun Capability charts show the welds/minute vs. governing metal thickness capability for a sample gun model for each configuration.

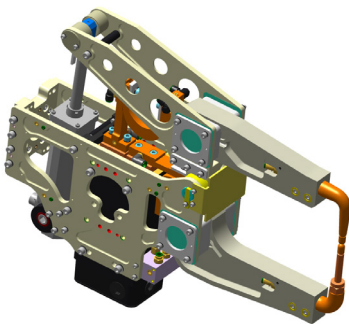
Charts for specific FlexGun UL models are available from CenterLine.

Key Design Features

(Individual model capabilities may vary.)

- Ultra-low gun weights – 56 to 69 kg
- Maximum weld force of 8330 N (5mm pitch servo) 7210 (10mm pitch)
- Rapid Tip Speed – up to 834 mm/s (Pinch style), up to 990 mm/s (X style) and 584 mm/s (C style); using library guns with 600 mm throat and ratios of .35 for pinch style and .59 for X style
- Integrated Robot Mounting – depending on gun configuration
- ISO "S" Frame transformers – 85 & 100 kVA MFDC
- Common body for each style – no LH or RH versions
- Only two (2) Servo Actuator models for the entire gun library (a 5mm and a 10 mm pitch)
- Contact us regarding the availability of gun covers

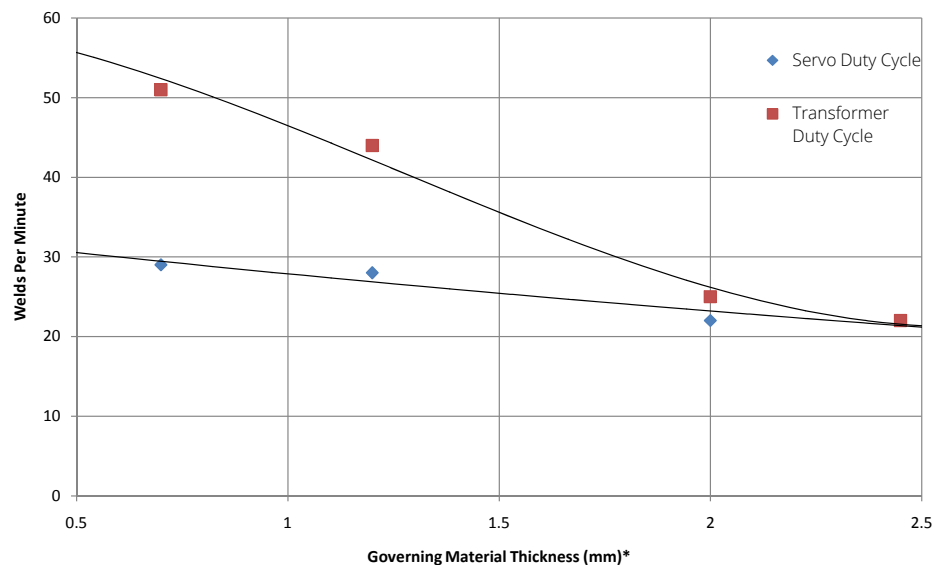
X GUN



Weld Gun Specifications	
Product Details	
Gun Family	Flex UL
Gun Model	CUSX9N-420-71439
Gun Mass	64.9 kg
Transformer Size	100 kVA MFDC
Screw Pitch	10 mm
Max Tip Force	5.7 kN
Throat Depth	318 mm
Throat Height	225 mm
Gun Ratio	1.036
Tip Motion Profile	
% Full Strokes	10%
Retract Stroke	20mm
Part Material	
Base	Mild Steel
Coating	Galvanized

Version 3.4

CUSX9N-420-71439 Weldgun Capability
Welds Per Minute Vs. Material



Conditions

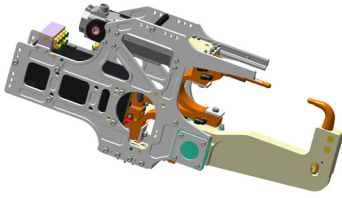
Tip Dressing (No Stepper) Assumed
Cap: B Nose

* Weld schedule parameters used for calculations are based on General Motors WS-4A and Chrysler PS-109

Disclaimer

The graph above represents the maximum capability of the weldgun in terms of welds per minute and must be taken into consideration with the amount of time remaining for all machine cycle functions (not limited to: part load/unload, clamping, sensing, etc.). CenterLine recommends a detailed motion analysis for each specific weld sequence.

C GUN

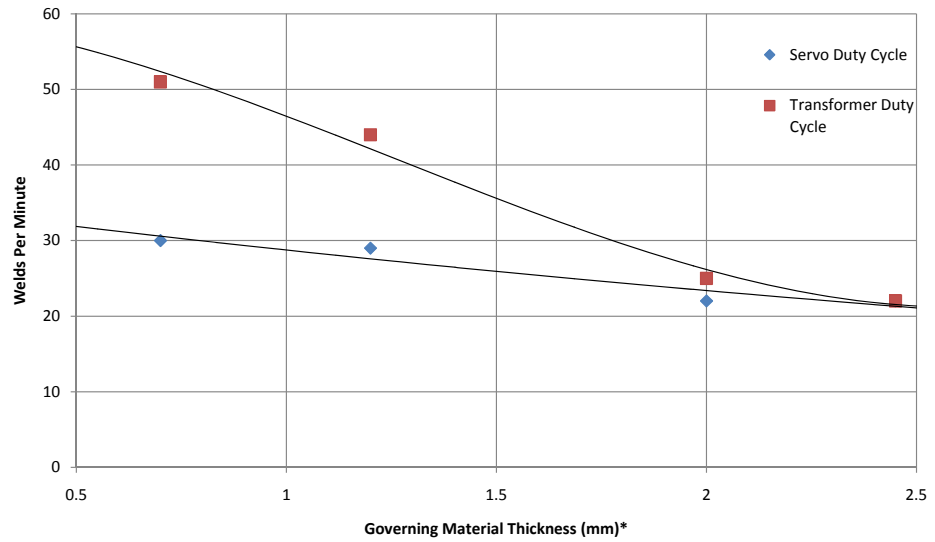


Weld Gun Specifications

Product Details	
Gun Family	Flex UL
Gun Model	CUSCIN-420-71330
Gun Mass	62.6 kg
Transformer Model	TDC-5583
Screw Pitch	10 mm
Max Tip Force	5.7 kN
Throat Depth	165 mm
Throat Height	193 mm
Gun Ratio	1.00
Tip Motion Profile	
% Full Strokes	10%
Retract Stroke	20mm
Part Material	
Base	Mild Steel
Coating	Galvanized

Version 3.4

CUSCIN-420-71330 Weldgun Capability Welds Per Minute Vs. Material



Conditions

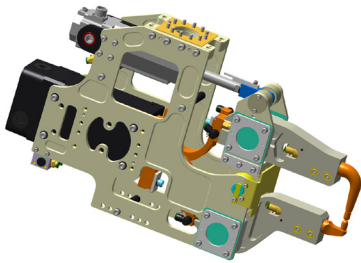
Tip Dressing (No Stepper) Assumed
Cap: B Nose

* Weld schedule parameters used for calculations are based on General Motors WS-4A and Chrysler PS-109

Disclaimer

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PINCH GUN

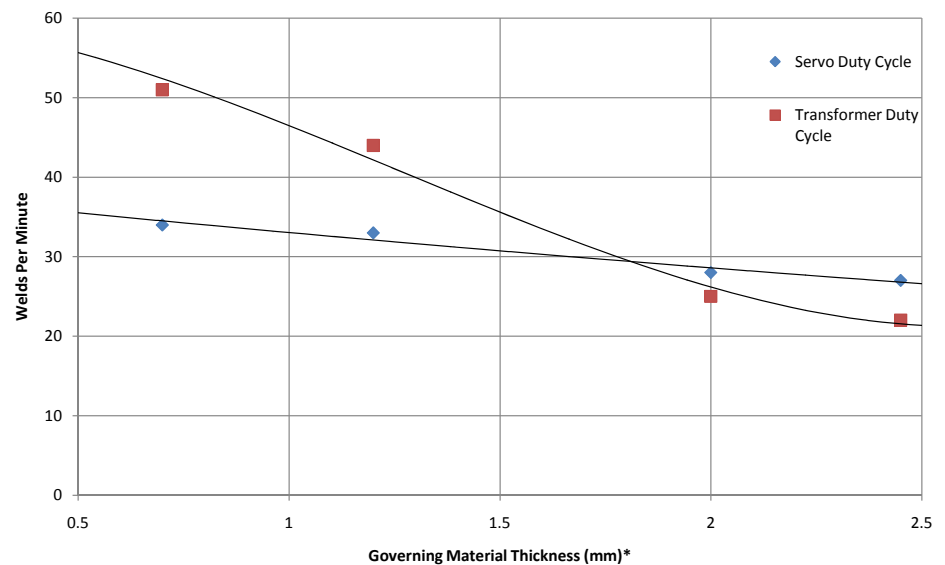


Weld Gun Specifications

Product Details	
Gun Family	Flex UL
Gun Model	CUSPIN-420-71358
Gun Mass	64.4 kg
Transformer Size	100 kVA MFDC
Screw Pitch	5 mm
Max Tip Force	7.1 kN
Throat Depth	218 mm
Throat Height	79 mm
Gun Ratio	0.83
Tip Motion Profile	
% Full Strokes	10%
Retract Stroke	20mm
Part Material	
Base	Mild Steel
Coating	Galvanized

Version 3.4

CUSPIN-420-71358 Weldgun Capability Welds Per Minute Vs. Material



Conditions

Tip Dressing (No Stepper) Assumed
Cap: B Nose

* Weld schedule parameters used for calculations are based on General Motors WS-4A and Chrysler PS-109

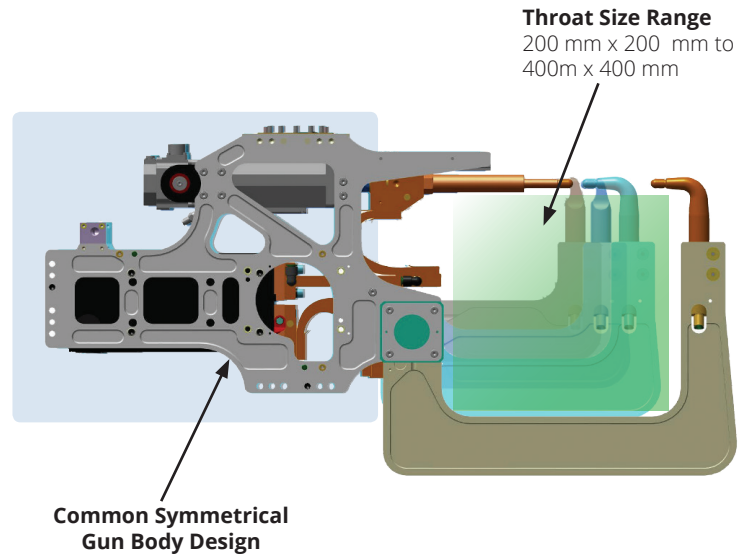
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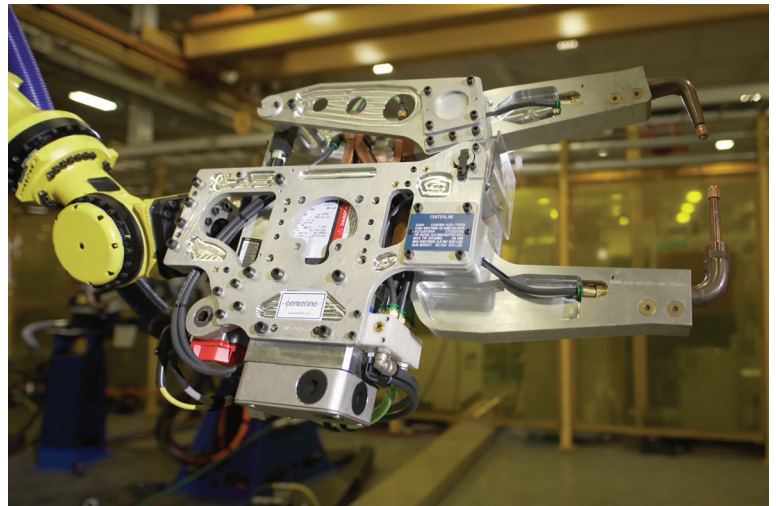
Why the FlexGun UL?

- **Optimum lightweight design** – integrated robot mounting eliminates need for additional bracket; streamlined profile for better access in tight areas.
- **Superior strength (weld force) to weight ratio** – greater capability from a physically lighter gun
- **True symmetrical design** – no RH or LH version or need to add components such as brackets and arms to adapt to changes in mounting conditions.
- **Third party transformers and actuators** – not limited to single sourced components or expensive replacements.
- **Single actuator style** is interchangeable across all FlexGun UL models, reduces inventory needs.
- **Actuator life rated to 20 million cycles.**
- **Standard gun library.** Extensive component interchangeability reduces spare parts inventory needs, accommodates potential future changes in gun configurations and enables designers to design a complete project using existing models.
- **Base designs cycle tested to over 20 million cycles.** Designs based on existing FlexGun RA specifications to ensure high reliability, dependable performance, and low maintenance needs.
- **Fit on 80 kg robots** – all standard models less than 70 kg for 85 kVA transformer (most under 70 kg for 100kVA transformers).
- **Designed to withstand 4G forces of acceleration** – able to accelerate and decelerate for rapid spot to spot speed to accommodate high volume production needs.
- **No less than 20% duty cycle.** Significant improvement over comparatively sized packages, allows for more welds per minute.
- **Ideal for high density manufacturing needs** – able to mount on smaller robots (less floor space, less capital costs), reduced weight allows for faster spot-to-spot movement, higher duty cycle for better production rate, reliable, robust construction for extended gun life and lower operating costs.

FlexGun UL Library



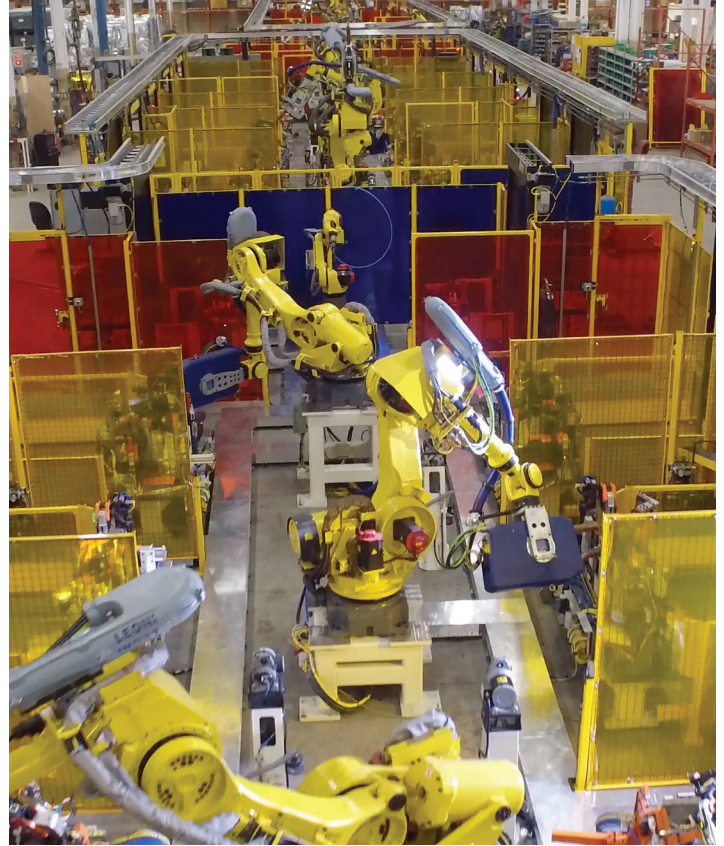
A standard CAD gun library is available with over 100 models to facilitate project design needs. Contact us to request a copy and for assistance in selecting the FlexGun UL best suited for your application.



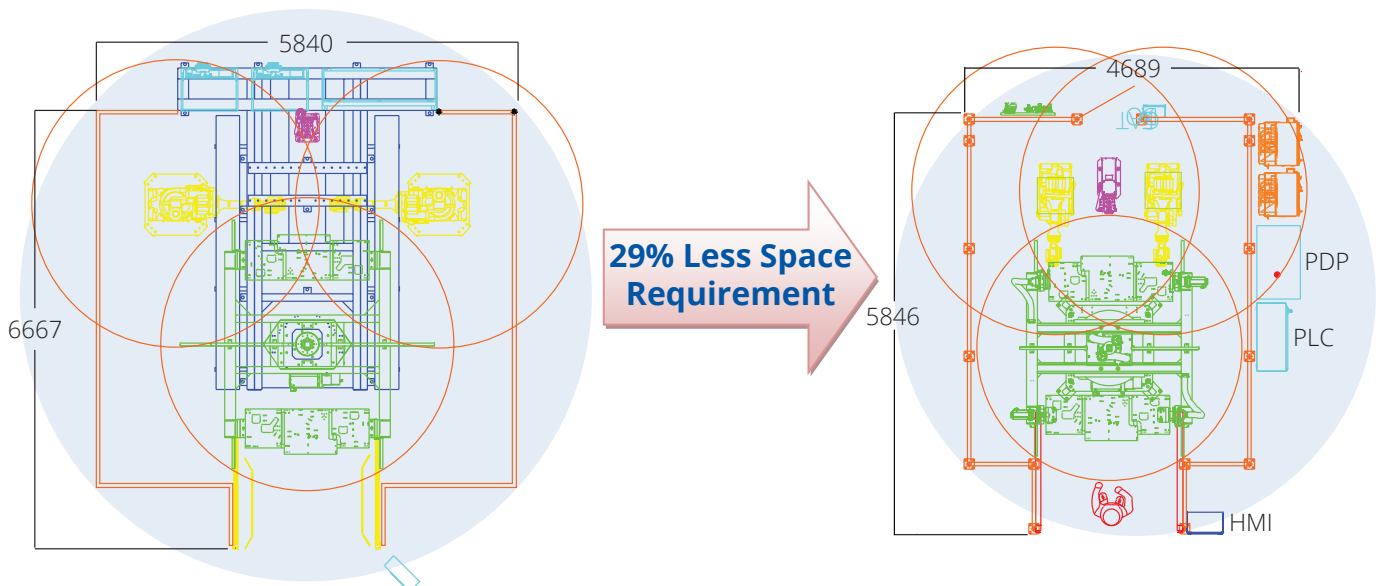
High Density Welding Cell

The FlexGun UL series guns are ideal for high density welding cell implementation. These cell designs rely on smaller robots with reduced payload capacity that consume less floor space. Smaller robots reduce initial capital costs, function at lower operating costs and reduce the overall manufacturing footprint.

High density cells require lightweight, slim profile, gun packages that can be quickly repositioned in confined spaces to perform spot welds on light to medium gauge assemblies. Applications requiring less than 8 kN in weld force and fast spot-to-spot gun movement benefit the most from this approach.



Standard vs. High Density Cell Design Comparison



- 2 Station Rotary Table
- 2 Fanuc 2000iB/165kg robots
- 38.9 m² Total Space Required

- 2 Station Rotary Table
- 2 Fanuc 1000iB/100kg robots
- 27.4 m² Total Space Required



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Printed in Canada
WGP-FG-FUL-BR-PR-1.3-0618
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