



ULTIMATE GUIDE

TO GETTING STARTED WITH WELDING COBOTS

Table of Contents

Introduction	3
Challenges of the Welding Industry	4
Welder Shortage Situation	4
High Welding Costs	5
The Need to Increase Productivity	6
Quoting Challenges: Costs and Lead Times	6
Automated Welding To The Rescue	7
Not All Robotic Solutions are the Same	7
Welding With A Collaborative Robot	8
What are Collaborative Robots?	9
Benefits of Welding With a Collaborative Robot	10
ROI: Getting The Most Out of Your Cobot	13
Calculating the Financial Aspect of Your Welding Cobot	14
Calculate the Return on Investment	15
The Intangibles	15
How To Get Started With a Welding Robot - Step by Step	17
1 - Get Everybody On Board And Set Your KPIs	17
2 - Decide on Which Task To Automate	17
3 - Start Small First	18
4 - Preparing the Jigs and Fixtures	18
5 - Choose Your Welding Cobot Solution	18
6 - Train Your Welders	19
7 - Troubleshoot, Optimize, Repeat	19
Discover the Cobot Welder	20
The Cobot Welder in the Real World	24
About Hirebotics	25

Introduction

Even though welding is an essential part of the manufacturing industry, there is a shortage of qualified welders. In the United States, the median age of a welding technician is 55, with only 20 percent of the total welders under 35. According to the American Welding Association, these demographics can lead to a predicted shortage of 440,000 welders by 2024.

Moreover, medium-sized welding shops are acknowledging the need to automate parts of their manufacturing process. But, the traditional industrial robots aren't always best suited for high-mix-low-volume productions. Enter the Collaborative Robots or Cobots.

Cobots are an excellent option for smaller welding companies looking to automate their production. They can help automate your welding operations with consistent quality and investment return within a few years. But before talking about that technology, let's try to understand the business challenges behind welding.

Challenges of the Welding Industry

Welder Shortage Situation

The average age of welders in the USA is 55. And hiring welder help is difficult because of the aging workforce. Young people are difficult to encourage to take up welding as a career. Young people are reluctant because they see the job as monotonous, dirty, and not paying well.

The welder shortage is nothing new. Back in 1999, the American Welder Association identified it, and they suggested investment in vocational welder education as a solution to the problem. This solution is an excellent one. But, it takes time for it to grow.

Currently, there is a strong push for students to invest in a college education which trends to veer young people away from vocational studies like welding. Unfortunately, twenty years later, the problem of welder shortage still exists. And worse than before.



High Welding Costs

Is reducing your welding cost part of your managing priority? Whether to stand out among the competition or increase your bottom line, welding costs are not to be neglected. Here are the main welding cost drivers that you can start to address:



Labor costs

Studies show that 85% of welding costs come from labor. So, labor is where you need to cut costs, but how? Think about how you can optimize your welders' time and work so that they can produce more and faster.



Reject, rework and scrap costs

Reduce those by detecting welding defects early on. When you don't notice a missed or faulty weld earlier, costs can escalate at every stage of the welding process.

For example, you can quickly repair a defective weld with minimal expense if caught early on. But a faulty weld detected after painting can cost more. It costs more because you'll have to strip the paint out and return the wrong part to the weld cell for repairs.

Moreover, the worst-case scenario of a defective piece is bodily harm or property damage. These, in most cases, will result in expensive lawsuits against your company.



Post-weld operations costs

Examine your welding process. Post-weld grinding of spatter and excess weld metal can eat up your welders' time and increase your lead time. With cleaner welds done the first time, you'll save time and money.



Non-value added tasks costs

Avoid paying overtime by streamlining your welding process. You want to reduce any unnecessary steps that cause delays and more welder time than needed.



The Need to Increase Productivity

The welding industry is very competitive. New materials and processes are continually being introduced. To stay afloat, you need to improve productivity. High productivity translates to increased profitability.

You can improve productivity by improving the consistency in your weld operations. Because of human constraints, weld quality will vary. Even the most skilled human welder in your company is sure to have a bad day. And the continuous monotony of the job can lead to tiredness and fatigue. Fatigue can manifest itself in the roughness of the seam weld and post-weld operations increase.



Quick Tip

Another way to up productivity is to examine your weld process with an open mind. Understand where the bottlenecks lie and either eliminate or replace them. For example, replace processes that cause unnecessary downtime. Minimizing quality issues can also boost productivity.



Quoting Challenges: Costs and Lead Times

In any welding shop, knowing how to calculate welding costs and time is essential. These two things are vital for client quotations and production lead time.

The challenge comes from calculating time as it relies on the human variable. We all know humans can be highly unpredictable. No matter how much allowance you give in your calculation, sometimes it's not enough. Delays can happen; your welders can get tired or have a bad day that can affect their work. This normal human behavior can wreak havoc on your lead time.

As you know, clients are not happy with delays and long lead times. Not having a surefire way to quote your jobs might lead to your company losing contracts or rejecting welding jobs.

OK, enough rambling about the challenges you face daily, let's talk about overcoming these!

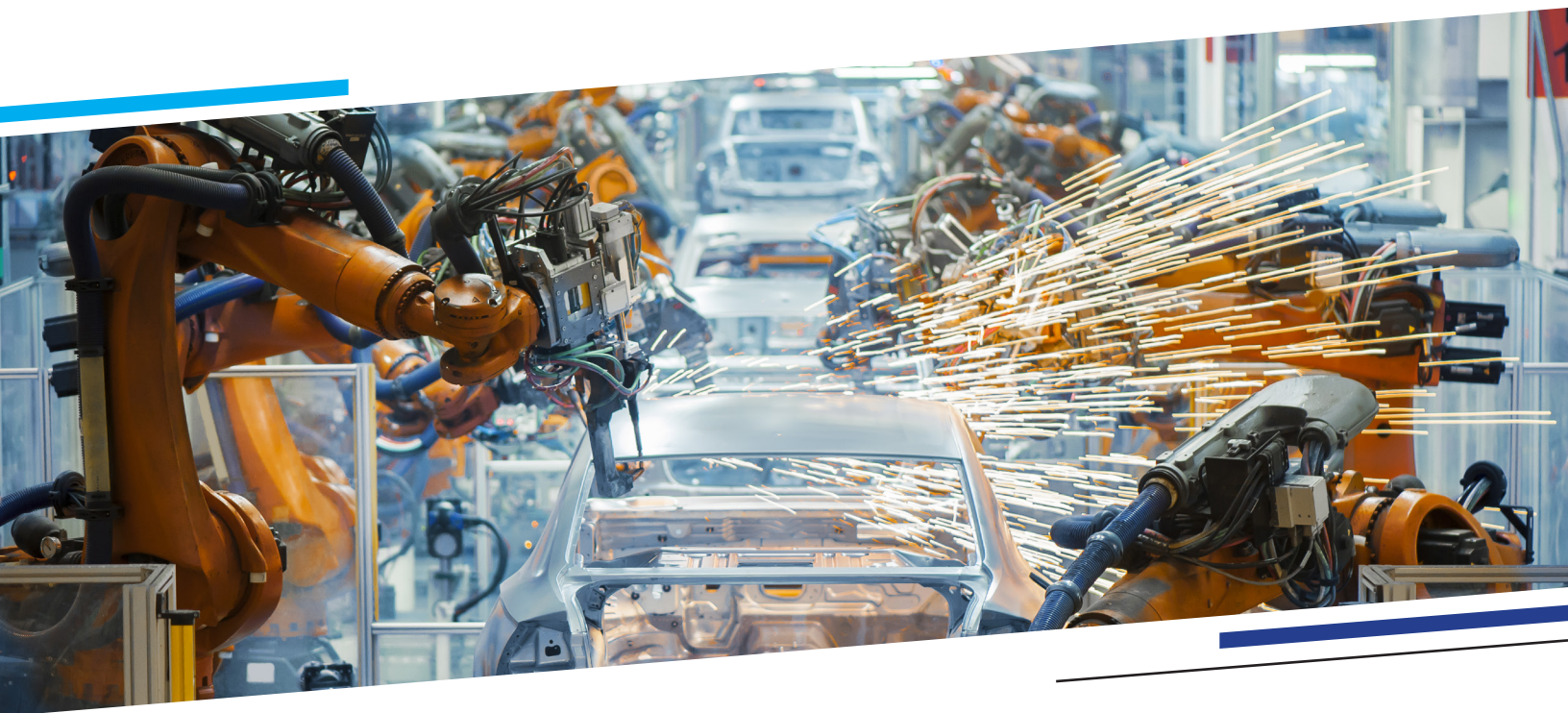
Automated Welding To The Rescue

Welding automation with robotics is one of the keys to solve the previous challenges. With robotic welders, you can do more work with the welders that you already have. They take over mundane, repetitive tasks in a precise and predictable manner.

Not All Robotic Solutions are the Same

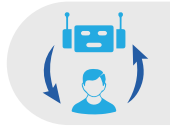


It all looks so great, but there is a catch: Yes, you heard right. For one thing, industrial welding robots were built with the automobile industry in mind.



They are big and bulky and are made for high-volume production. They also require complex programming. These robots can be more expensive with their rigid installation and jigs placed in a robotic welding cell. They are not so much a fit for the low volume, high mix environments of most small and flexible welding operations.

These reasons make the industrial robot less than ideal for your low volume, high mix environments of small to medium companies like yours.

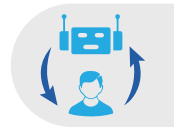


Welding With A Collaborative Robot

If automation is the answer to your problems, but industrial robots are not the right fit, what is?

Let's talk about collaborative robots. [Welding with a collaborative robot](#) is a viable option for businesses, especially those looking to automate their welding workflow. They also work great with low volume, high mix environments.





What are Collaborative Robots?

Collaborative Robots are robotic arms coupled with end-of-arm toolings (EoAT) like grippers, sensors, or welding equipment. Once programmed, they can work safely with humans in a shared space, unlike traditional industrial robots that work with no human intervention.

Cobots are an ideal choice for smaller manufacturers who deal with low-volume, high-mix production for many reasons.

Once set up, they can work alongside human workers, unlike industrial robots built to do one task in a high-volume environment.

Industrial robots may need complex codes and programming, but you can use cobots even if you have no programming experience.

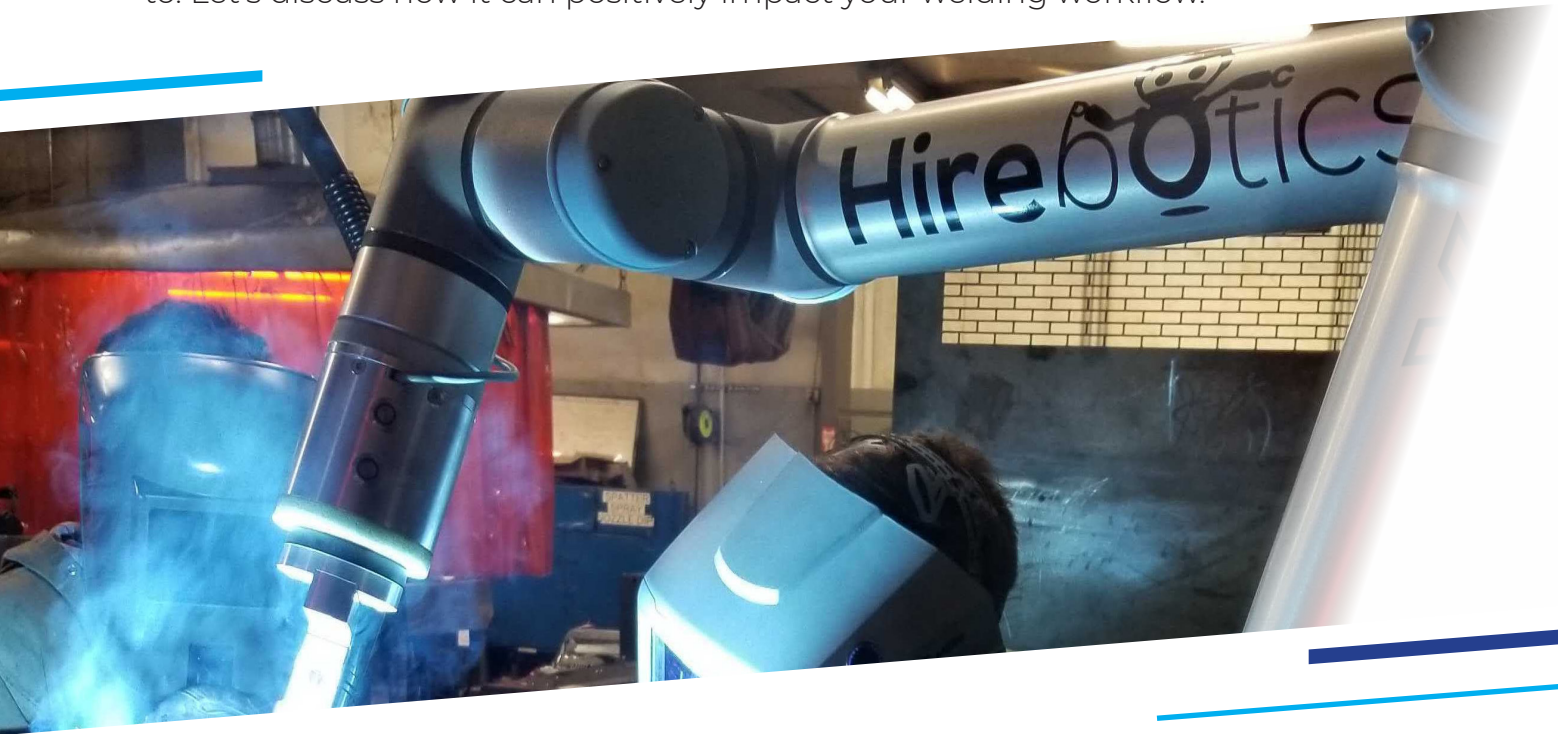


Collaborative robots are small and lightweight, and workers can move them around the factory floor to automate different tasks.



Benefits of Welding With a Collaborative Robot

There are many benefits to welding with a collaborative robot, cost savings, boost in productivity and flexibility are just a few of the advantages that you can look forward to. Let's discuss how it can positively impact your welding workflow.



Case Study

If you want an excellent example of how a welding cobot integrated into a medium-sized company, you don't need to look any further than Wisconsin.

Processed Metal Innovators LLC (PMI) is a Wisconsin-based metal fabricator that manufactures stamped and welded metal parts for appliances, automobiles, appliances, and more. Unfortunately, like most companies in the welding industry, PMI suffered from a shortage of certified welders and had to turn away large quantity orders. Besides, industrial robotic welders were not a fit for smaller production batches.

PMI turned to a welding cobot tool to increase its production capacity and profitability. The pairing between man and machine worked, and PMI could quote work that they weren't able to do before. They also increased their production by having the cobot welder ready to weld the parts even before the client approves the purchase order.



Increased Capacity and Boosted Productivity

Suppose you have a small to medium welding company struggling to fulfill large order quantities. In that case, a cobot welder can help you solve these issues. It can weld small parts all day if needed without taking a break and take the pressure off your welders. They can then concentrate on other more significant, value-driven tasks.

Also, it's lightweight, and without safety fences, so it can be moved from one location to another as needed.

You can also take on different new jobs with small or bigger batches while understanding the cost and time needed to produce. Using solutions like the [Cobot Welder from Hirebotics](#), you can track the performance and productivity of each job. This allows you to offer better pricing and clear lead time at quoting time.



Cost Savings and Flexibility

In high-mix, low volume production, a collaborative robot is adaptable to perform different tasks in a day.

Once programmed, a welding cobot can pull up already programmed jobs anytime and adapt to new sizes and geometries. For example, a collaborative robot can do a small batch production in the morning and do another job in the afternoon. Think of it as having an all-around assistant ready to help with any task.

And because of its increased precision, a welding cobot tool can use materials more efficiently and welds faster. This translates to cost savings and higher yield. Studies show that you can expect [a return of investment](#) within 6 to 13 months with a welding cobot.



Constant Quality

It's no question that certified welders are great at their job. Still, the constant repetition of the task can often result in human error and sometimes poor quality results as the welders get tired.

A cobot welder can take over the repetitive, mundane tasks of welding small parts. Once programmed, it produces the same quality 24/7 as required. Again, this automation assists your welders and frees them up to do more critical tasks.



Easy to Install and Maintain

Industrial welding robots are bigger, need to work in enclosed robotic cells, and need advanced programming knowledge to set up. Welding cobots, on the opposite, are relatively easy to install and move around. They also don't need robotics specialists to program. Instead, you can train your current welding team to start, program, and maintain the robot.

Collaborative robots are making welding automation more accessible to SME's than ever. They are increasing productivity and bringing cost savings through their ease of use and flexibility.



ROI: Getting The Most Out of Your Cobot

What is the true value of adding a welding collaborative robot to your workflow? And if you do invest in one, when will you get your investment back? To answer these two important questions, most people calculate the Return of Investments (ROI).

To get started, let's define what ROI is. ROI is a metric used to calculate the benefits you will receive in relation to your investment. It will tell you if your investment (in this case, a Cobot Welder) is worth it. If it's not, then you may have to reconsider your automation project.

There are many ways used to determine ROI and most businesses use the payback method. The method works by dividing the cost of the investment by the salaries of your welders.

But to have a more realistic ROI estimate, a better way is to consider the intangibles - the benefits that your company will get in the long run. Those are often not black on white but so important to consider.

Calculating the Financial Aspect of Your Welding Cobot



Once you've chosen your collaborative robot project, the next step is to crunch some numbers to determine the ROI. A good rule of thumb is to aim for a realistic two-year ROI. In your calculation, you want to include the following factors.



The Total Cost Of the Welding Cobot System

Take into account the total system cost of the robot welding system. For the collaborative robot cell to be complete, you need more than just the robot. The cobot itself is usually only a third of the cost of the entire system.

The common setup includes the welding jig and fixtures. Jigs and fixtures are needed to put the parts together. After this, the cobot welding tool can perform its job. The jigs are made to localize the parts so that the robot welds at the same place every time.

You may also have to consider the cost of engineering, programming, and installation. Yet, some collaborative robots like the Cobot Welder from Hirebotics are easy to use and don't require programming knowledge. You can then have your actual welders program and set up those welding cobots which will save you extra costs.

To get a reasonable estimate for the total cost of an automated welding robot, you can triple the cost of the selected welding robot.



Working Shifts

You want to take into account how often and for how long the robot will work. When you calculate the robot working shifts, multiply the number of hours per shift by the number of shifts in a day. Then calculate how many days in a week and how many weeks in a year the cobot will run.

One interesting element to consider is that with a fully functioning robot cell, you'll now be able to produce weld parts lights-out! Whether it's for a couple of hours after the working days or for a full night shift of production, the productivity gains will have a great impact on your ROI!



Labor Cost Savings

The first variable that is usually considered when calculating the ROI is the labor cost saving. You'll see later on that there is much more than this. Yet, this cost-saving remains an important part of the ROI. To get that number, you need to consider the annual labor cost for a worker that the welding cobot will supplement. This number should include the salary, insurance, and any other benefits.



Maintenance & Team

Collaborative robots have minimum maintenance necessary. However, working with that technology may require you to develop your automation team. This team can be assigned to do programming, jig designs, maintenance, and repairs for your cobots. These extra costs (salaries & maintenance costs) can be factored in the calculation of your ROI.

Calculate the Return on Investment



By using those previous variables, you'll be able to calculate the payback period, the labor & productivity savings.

$$\text{Payback period} = \text{Total Costs} / \text{Total Savings per year}$$

It looks complicated, but don't worry. There's no need to calculate it manually unless you want to. There are a lot of ROI calculators online that will do the job for you. The one from Automate.org is one that we recommend.

The Intangibles



Intangibles are benefits that you get from automation but don't have a hard monetary value. However, those benefits can have a great impact on your ROI. Let's take a look at some of them.



Production Stability

A collaborative robot delivers consistent quality with each weld. This kind of precision maximizes your raw materials, saving you costs. Cobots don't tire and can be easily programmed to shift from one task to another on the factory floor. So you always have a ready-to-weld system for your production needs.



Employee Safety

Welders can suffer from work-related problems. This can range from minor lung irritation down to life-threatening lung cancer. Automating welding processes with collaborative robots can help decrease your welders' exposure to toxic fumes. This change results in better health for your workers. And, in turn, lower social, medical, and insurance expenses to your company.



Improved Efficiency

Cobots frees your experienced welders from doing monotonous welding tasks. They can then go on to do more significant and more critical welding tasks like setting up new jobs. This translates to better efficiency and better value for your business with the same amount of workers.



More Return Clients and Businesses

No matter who you ask, having a cobot on your factory floor looks very high-tech and impressive, especially to your clients. But they will be even more pleased with faster delivery times and the work quality. For example, the Cobot Welder App offers real-time weld times. The app gives you a precise number to calculate an accurate lead time to better quote your clients. Remember that satisfied customers come back to bring in more business.

When you look at your ROI, you should consider all the clear costs and savings we discussed above. But do not forget to include all the intangibles. Together, they will give you a very clear picture of your cobot's ROI.

How To Get Started With a Welding Robot - Step by Step

After much consideration, you've finally made the leap and decided to add a cobot to your production floor. Everybody is excited (as they should be) about the new addition to the team; a welding robot!

But now, what do you need to do next to get ready?

1 - Get Everybody On Board And Set Your KPIs



Getting everybody on the same page is one of the first things you need to do. Gather the team together to make sure everybody knows of the new addition to the team. This meeting is an excellent opportunity to address your team's concerns and questions about the cobot welder. Answering everybody's concerns will ensure that everyone will be as enthusiastic as you about the new addition.

As soon as everybody is up to speed, sit down with your team and set up Key Point Indicators (KPI's). They're basically expectations or goals that you want to track the performance of the cobot against.

An excellent point to start is to set the productivity level of the cobot to the same level as your welders. Since a robot can work more hours and deliver consistent quality, you'll see an increase in overall productivity in the near future.

Knowing your KPIs is important because this allows you to see if the project is a success or not. So, keep tracking the results when the cobot arrives on your factory floor so that you can have a clear picture if it works or not.

2 - Decide on Which Task To Automate



You want to take a look at your welding process and decide which parts you want to automate. **Remember, you can't always automate 100% of your process.**

You can choose monotonous parts to weld, taking them off from the hands of your welders. You can also select parts that need a high degree of weld quality. The cobots can make the welding seams more precise and uniform every time.

You also need to consider your parts sizes. Although a collaborative robot can certainly weld any size, the sweet spot is a smaller 4' x 4' piece that can easily be fixed on the welding table.

3 - Start Small First



At first, it's not necessarily about going for your bottleneck or most significant return on investment (ROI). More often than not, those tasks will be more complex to automate. It's not to say that ROI is not important. But for your first automation project, the better strategy is to get started and learn.

Throughout a short period, you'll build your expertise and the confidence to automate more complex and valuable processes.

4 - Preparing the Jigs and Fixtures



Cobots need accessories to work repeatably. So you will also have to think about how you'll hold your parts during welding. Those jigs and fixtures are meant to present the weld seam always at the same place since the robot is programmed to go back to that same place every time.

As a manufacturing company, you may have the resources to design and create your jigs. If not, you can always choose to outsource it to a machine shop. Your cobot supplier can also advise you on what type of jigs and fixtures are the best for the robotic welding cell and your production.

5 - Choose Your Welding Cobot Solution



Now comes the exciting part of choosing your welding cobot. The good news is that there are a few welding cobot solutions out in the market to choose from. But, how do you choose the best one for you?

Choose a welding cobot that's easy to use. Collaborative robots generally have the advantage of being easier than industrial robots. However, not all cobot welding solutions are using the same programming interface or functions. Look for an easy-to-understand graphical interface that even your welders can learn and use rapidly.

Being able to demo the cobot welding solution you are looking at is also a plus. You can even have your welder to test the welding cobot and see if they can use it easily and if they like it.

6 - Train Your Welders



You want your welders to know how to operate the cobot. So training them will be important. Usually, the welding cobot supplier will be able to train your welders. As an example, with the Cobot Welder, this “training” takes no more than 20 minutes to get your welders up to speed.

You'll also want to make sure to document this training. This way, you'll be prepared if you are losing your primary robot operator. We saw this happen more than once, that the person with all the robotic knowledge did quit. The company then had to start from scratch in learning about robotics.

7 - Troubleshoot, Optimize, Repeat



Once your robotic welding cell is in production, you will have to make some adjustments to have a fail-proof program. It is part of the normal process to get a fully productive robotic cell.

Once you have addressed all the possible issues with your cell, the next step is to improve it. The goal is to achieve your targeted KPIs. For that matter, another important tip is to be able to track your robot performance. You can use the built-in software of the welding cobot you choose, if it applies, or add a data-tracking software.

Discover the Cobot Welder

The easiest and more accessible cobot welding tool on the market! Made by welders for welders!

Are you looking for a cobot to bridge the gap for your welding needs for automation? Do you want your welders to be able to use the automated welding solution right away? Then let us introduce you to the Cobot Welder From Hirebotics.

Why choose the Cobot Welder



There are many collaborative robots out there for you to choose from. But why should you pay particular attention to the Cobot Welder from Hirebotics?



The Complete Package for Easy Deployment

[The Cobot Welder](#) comes complete with everything that you need to start welding. The package includes all the necessary hardware and software for a fast and easy implementation on your plant floor.

[The package](#) uses the most renowned collaborative robot on the market, the Universal Robot UR10e. The Cobot Welder will come already assembled with the Miller welding system (Miller Invision MPa 352 welder and S74 feeder) and with a welding table (32" x 48").



Hirebotics did also develop their Smart Puck device that is installed on the robot flange. Its use is to teach your Cobot Welder to weld anything without touching the teach pendant. You can then create weld waypoints with two buttons; use the green-lighted button to move the arm in freedrive and the blue-lighted button to record the position. Easy peasy!

The most essential component of this cobot welding solution is how you can program it - If we can call this "programming".

Do More with The Only App-Based Cobot in The Market



The Cobot Welder is made to empower your welders to take advantage of robotic welding. There is no need to have a robotics degree or even experience with programming, thanks to its app-based interface. All you need to do to start using it is downloading the app to a phone or tablet. This way of teaching the robot was created with welders in mind. It deals with torch angles and weld settings. And not complicated coordinate systems or programming code.



beacon

The app called Beacon runs on all platforms: the web, Android, or iOS. If you want to use it on a mobile device, you can go to the App Store or Play Store. Search for “Beacon” and download the app. If you want to access Beacon through the web, go to <https://beacon.hirebotics.io>. And best of all, it's free, forever.



Be In Control of Your Cobot Welder

As you read, the software Beacon powers the Cobot Welder. With this, you can easily configure real-time alerts on the software. No matter where you are, you will be able to receive real-time alerts when a job is done or when the Cobot Welder needs your attention. Also, You can get notifications if your cobot goes on a protective or emergency stop. In brief, You can easily configure which type of alerts you want to receive.



Don't Go Blind: Make Better Quotes with Real-Time Data

The Cobot welder provides you with real-time data like precise cycle times and consumable usage. This information is handy when you are quoting a new job. You no longer have to make wild guesses about the numbers. Providing a precise lead time can impress clients and can lead to repeat orders in the future.



In addition to this, you can create impressive charts using custom data in no time. You can view these real-time charts on the web or your mobile device.

The Cobot Welder in the Real World

It's all well and good that you've been reading about what cobots are and their benefits. But how does the Cobot Welder stack up in the real world? And how easy is it to operate?

Get Access to the Case Studies [HERE!](#)

Three experienced welders from small-medium welding companies tried the Cobot Welder for the first time: Adam Yutzy from PWI Inc, Thomas Tillotson from Alphidia Inc, and Kyle Gaynor from Athena Manufacturing Inc.

These men are experienced welders. But they have little to no experience programming a robot before other than playing online games on their phones. Within the first 20 minutes of the demonstration, these men were able to program and work the Cobot Welder by themselves.

“

The robots that we have now, you need an associate's degree to operate that kind of equipment. But this is simple. We don't need a robotics programmer to program the machine.

”

This statement sums up how experienced welders see the Cobot Welder. It's easy to use, understand and deploy.

Now that you've completed our getting started guide about welding cobots, what next step will you take?



About Hirebotics

Our Mission

To make automation easy, affordable, and within the grasp of manufacturers across all industry types and sizes.

Our DNA

Our Team has a deep experience in manufacturing, operations management, software and hardware development and robotics and automation. We are passionate about helping manufacturers improve their competitiveness through technology.

Get In Touch



hirebotics.com



1-615-800-2684



624 Grassmere Park, Suite 21, Nashville, TN 37211

