5 Key differences between Industrial and Collaborative Robots

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A Ferrari may have more horsepower than an F-150, but in a mud race it is going to be worthless once its tires first leave the pavement. The same holds true for collaborative and industrial robots: use them the right way and they are incredible but use them the wrong way and it can be a waste of money at best and dangerous at worst. When you need to go off-roading, make sure you pick the right vehicle, the same is true for implementing a robotic system. If you are not sure what you need, find a distributor or integrator and enlist them into helping you select the correct type and model of robot for your application.

1. Safety

Both types of robots can provide excellent protection, but both can also be implemented in a hazardous and potentially fatal manner. A collaborative robot's primary method of protection is by detecting a collision with a person and stopping its motion. The advantage of this is that do not need a bulky or complex guarding system. These robots can also be mounted on carts making it possible to use one robot for multiple applications at a plant or factory.

There are however some pitfalls that must be carefully avoided when using this method of protection. Care must be taken to evaluate the potential impact point with a human. For example, it is important to ensure that the robots end effector is not operating at the head or eye level of a human. If the speeds are slow, but the object the robot is carrying impacts the eyes of an operator, even a small amount of force could cause permanent damage to an operator's eyes. The same care must be taken when looking at what the robot is moving. If your system is carrying a sharp object such as a knife any motion including those at slow speed can create an unacceptable hazard.

With an industrial robot, the entire area of motion must be protected. There are several ways to do this, typically through light curtains, 2D area scanners or hard guarding such as a safety fence. Access to the robot for maintenance or removing stuck products must be available, but it must stop any movement.

A bit more sophisticated way to squeeze more performance out of a collaborative robot is to allow it to run faster when there is no human in the area and slow it down as a human approaches. This can be done by having different zones that can slow the robot.

Safety is paramount to implementation of any robot system. If you have a great system that saves you labor dollars for years, but eventually hurts someone it would have been better not put in the robot at all. Performing a hazard analysis during the design phase of the project is a necessary and important step in preventing injuries. If you are not sure how to perform one, a robot distributor or systems integrator will be able to steer you in the right direction.

2. **Speed**

Industrial robots have a clear speed advantage. However, if you are looking to simply replace the motions of a human, usually a collaborative robot will be able to match your requirements.

I have seen many applications where the factory has heard about collaborative robots and brought me in to design a system. Once we sit down and review the specifications, the customer mentions that they would like to increase the speed of the line which would require the robot run faster than possible in collaborative mode. Often, this negates any advantage of the collaborative system, and we end up designing and installing an industrial robot.

3. **Payload**

As a general rule, industrial robots can carry much more than a collaborative robot. However, in recent years the payload on collaborative robots has been increasing. One major brand now offers up to a 35kg robot. Anything over this and you will be forced to use an industrial robot.

4. **Cost**

Industrial robots have been around for several decades and thus much of their development has been paid for long ago. Even new models are built on a solid foundation of robotic principals that are well established. Collaborative robots are a more recent development and their ability to finely detect a collision makes their costs usually more expensive.

5. **Programming**

Collaborative robot manufactures have gone out of their way to make what I call “surface level” programming like simple movements or a sequence of movements easy to perform. This can typically be done with a mode that lets the user physically move the robot to the desired location and press a button to “save” the position. For many applications this is adequate, but as requirements for the robot get more sophisticated, so does the method of programming. The good news is that the manufacturers have all provided ways to allow for a deeper level of programming. Thus, you have room for both the beginner and the robotic expert to program the system.

Industrial robots almost always use proprietary software usually through a pendant, PC software or a combination of both. Some are very modern and provide as much time saving and ease of use as possible. Others are clunky and can feel “DOS”. What I have found is that just like PLC’s, most brands do the core of their tasks very well, it is around the edges of its capabilities that you see some differences.

In this labor starved market, robotics and automation are a necessity. I have a saying that I have found is generally true for manufacturers: “Automate or die”. If you don’t, your competitor is likely to.

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