

Team player

Staff report

As robot-based automation spreads to ever more industries and applications, the demands placed on hardware and software grow more rigorous. With every hour of downtime a drain on the balance-sheet, customers across the world clamor for solutions that are not only easy to integrate, program and use, but that are also dependable. Plug and produce has to mean just that.

As the supplier of the world's largest installed base of robotic products, ABB is expected to lead the way, and to provide the benchmark by which all robots – including our own – are measured. This is the setting for the design and launch of the IRB 6600, a dedicated team player and more than a match for the toughest applications in spot welding, material handling and machine tending.

But the job was not easy, as Thomas Gunnarsson, Product Manager IRB 6600, points out: "The automation industry demands a high level of flexibility, accuracy and payload capacity. Equipped with our new 'bending-backwards' arm concept, mechanics and control system design, IRB 6600 not only caters to all those demands, it's also the most compact robot in its class. It's built to cut production costs as much as possible."

Bending over backwards to be flexible

Space is a precious resource not to be wasted. That is why the IRB 6600 provides what can best be described as bend-over-backwards capability: The robot arm can be simply swung over backwards; there is no compulsion anymore to rotate around axis 1. This makes the cell more compact – and less costly.

The benefits are clear. For a start, tool changes are accomplished faster. Secondly, the working range of the robot is greatly extended, giving the customer the freedom to make future changes in production. Thirdly, the IRB 6600 is able to work with overhead conveyors, should the application call for it, without having the entire line reorganized. Finally, unlike robots from other companies, the IRB does not have motors on the upper arm that point backwards. This results in further reductions in cell-size and fixed costs.

These benefits are all reinforced by ABB's tried and tested motion control, permitting controlled operation in confined spaces.

A safe investment

Regardless of application, safety is a key consideration. That is why particular



At the heart of the IRB 6600 development lies a thorough investigation of our customers and their needs. Guided by input from our target market, and the wealth of experience gained from the 6400 series, 200 development engineers went to work knowing exactly what was expected of them. The result is a new power robot that is every bit as productive, flexible and dependable as was hoped.

- Robotics^{IT} articulated robot, IRB 6600

attention was paid to the choice of construction material. In the end, rugged cast steel was chosen. This allows the robot to withstand high stress and collision forces – even when traveling at speed. In this respect, the steel grade chosen was superior to a host of other metals, including aluminum.

Safety – active and passive

A range of software products have also been added – all falling under the umbrella designation ‘active safety’ – to protect not only personnel in the unlikely event of an accident, but also the robot itself.

There are a number of active safety features included in the IRB 6600 package: LoadID, which, as the name implies, identifies loads and measures tool inertia, and Collision Detection work in tandem to protect peripheral equipment, while cutting downtime in the process. An electronically stabilized path, a TrueMove feature, keeps the robot on its pre-programmed path. Software sensors ‘sense’ accelerations and stresses in metal, motors and transmissions, helping to optimize each work-cycle. Furthermore, self-tuning performance permits the robot to adapt to true payloads. It runs faster with a low load, and slower with a high one, both reducing cycle time and facilitating higher throughput.

Then there is the Active Brake System (appropriately abbreviated ABS), which not only controls braking while ensuring

the robot doesn’t stray from its path, but also allows rapid recovery. After a braking operation, the IRB 6600 is able to resume its duties without delay.

There are passive safety features, too. These include movable mechanical stops, double-safe limit switches, the special shape of the lower arm and the compactness of the upper arm.

Securing production

In this era of rationalization, plants, people and machinery all have to produce more in less time; the quest for efficiency is unending. With the launch of the IRB 6600, ABB is making every effort to ensure the machines stay on-line. Of course, the safety features mentioned above all make a valuable contribution

to this cause. But sheer toughness is not the only way to help plants meet – and beat – their productivity targets.

Colin Luthardt, Manager, Body in White Products, looks at it from the customer’s perspective: “Understandably, buyers of robotic products want to play it as safe as possible. After all, they’re making an important decision. The IRB 6600 is sure to be attractive since it’s designed to protect the customer’s investment.”

At your service

The IRB 6600 features a built-in Service Information System (SIS) to monitor motion and load. Based on information received, the system anticipates the next service interval, making it easy to plan the service and maintenance requirements of either a single robot or an entire line. Furthermore, thanks to WebWare, the customer can be 1,000 miles away and still keep an eye on his machines.

Time is money

When it comes to production cycles, every fraction of a second counts. To save time, the IRB 6600 is built to cut every conceivable corner except one – quality. As mentioned above, software sensors and self-tuning performance help to optimize each work cycle. In addition, the IRB 6600 delivers an impressive wrist torque of 1320 Nm. All in all, cycle times are 3–4% lower with the new





process machine compared to its predecessor, IRB 6400R.

Built for harsh environments

High precision and agility do not preclude robustness. IP 67 classified and foundry protected, the entire robot is resistant to corrosive environments and fluids. Submerge it in water, and it will still work. Moreover, the cast steel structure is very robust; even significant increases in temperature will not cause it to expand.

Just plug and produce

Customers want simplicity. To oblige, robots have to be easy to install, easy to

program, easy to service, and easy on the balance sheet. With the IRB 6600, simplicity starts before installation:

Thanks to RobotStudio, ABB's off-line simulation software [1], customers can create a virtual cell on a PC, which replicates the actual cell down to the tiniest detail. This makes it easy to iron out any wrinkles, cutting both start-up times and costs.

And physical installation is also easy: A base plate is provided to speed up the mounting process on the shop floor. Thanks to the Quick Mounting Tool, it takes practically no time at all to attach tooling, while track motion allows the customer to integrate the robot in a moving line.

The IRB 6600 is equipped with an optimized process cable package to handle most applications. Electricity, water and compressed air are all integrated for quick installation and efficient production.

Modular design takes care of tomorrow

Production demands always change, and the IRB 6600 is designed to accommodate change with an extremely simple modular concept. An arm extender and a wrist module are all there is to it – the cabling is already prepared in the upper arm. Finally, thanks to a novel Servo Tool option, the robot is ready to handle additional motors and axes to accommodate, for example, robot-carried or floor-mounted tools or weld guns as well as track motion.

With the new IRB 6600, and the earlier launch of the IRB 7600, ABB is ushering in a new era of power automation – powerful, flexible and as dependable as leading-edge engineering will allow.

Product Manager Thomas Gunnarsson sums up: “Power to the people who need it – production managers all over the world.”

Reference

[1] U. Sallsten: IndustrialIT for robotic applications. ABB Review 3/2001, 28–30.