Grow smarter with automation

By Giel Verhoog, Key Account Manager West Nederland, SMC Netherlands

Today's controlled environment agriculture (CEA) facilities have little in common with traditional farming. They're high-tech production environments where continuous improvement isn't just desirable; it's non-negotiable.

While many people still associate agriculture with traditional farming, modern CEA is all about highly sophisticated growing environments. Behind every tomato, pepper or cucumber grown in a modern greenhouse/glasshouse lies an extensive array of automation and process control technologies, all supported by continuous improvement initiatives aimed at driving down cost and optimising resources.

And there's something particularly interesting about this sector. Many of these businesses still see themselves as family growers. Some have been growing vegetables, fruit or flowers for generations, but that doesn't mean they're stuck in the past. Quite the opposite. They're constantly looking for ways to grow a little more, a little faster, with less water, less energy and less waste.

These growers are the end customers of the sector's machine manufacturers and process system integrators, who in turn are the knowledge partners with whom we work to meet growers' needs.

In many ways, they're among the most innovative companies you'll find in the agriculture business.



It’s all about improvement

Let’s think about what growers are up against. They need to produce high volumes of consistent-quality crops while minimising costs. At the same time, they’re dealing with labour shortages and increasingly unpredictable weather patterns.

And there’s another challenge that’s easy to overlook: time. Consumer products can often sit in a warehouse or on a supermarket shelf for months. Fresh produce doesn’t give you that luxury. Once it becomes ripe, it needs harvesting, sorting, packing, transporting and selling. There’s no pressing pause.

That creates a powerful incentive to keep improving. If a process can be made slightly faster, more reliable or more efficient, growers want to know about it.

This mindset is very familiar to us at SMC

Our Japanese heritage is closely associated with kaizen and continuous improvement: the idea that you don’t necessarily need one huge breakthrough to make a difference. Sometimes it’s about implementing a series of small improvements that, over time, prove significant.

No two greenhouses are the same

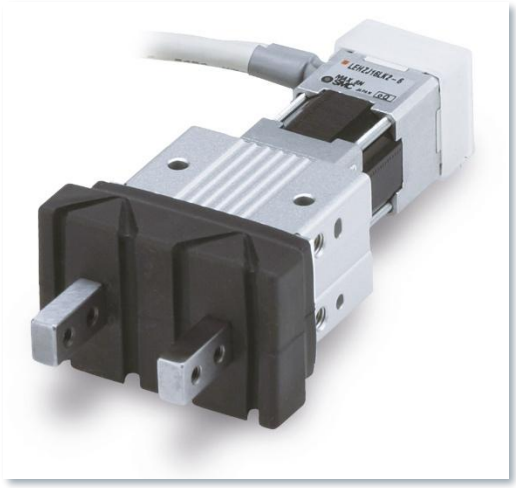
Here’s where CEA gets particularly interesting. In a typical manufacturing environment, you might be producing thousands or millions of identical products. The process is designed around something that’s consistent.

Agriculture is different

A machine handling tomatoes might have completely different requirements from one handling peppers or flowers. Plants vary. Growing environments vary. Processes vary. Even two growers producing the same crop can have varying needs. Whether the project’s about reducing labour in processes like planting or harvesting, the supply or recovery of nutrient solutions, industrial communication, CO2 supply lines, storage systems, or temperature control - there isn’t always an obvious off-the-shelf solution.

And this is one of the things we’ve learnt from working in the CEA sector over many years. Here at SMC, we want to understand what customers (machine builders, system integrators) and end users (growers) are actually trying to achieve before deciding how we can help.

Sometimes a standard cylinder, actuator, valve, pump, regulator, flow switch, sensor, filter or chiller is exactly what’s needed. That’s usually the best option in terms of cost, availability and simplicity. But sometimes the application demands something different. Agriculture is, after all, a demanding environment, where dirt, moisture and other conditions can influence how automation needs to perform.



SMC´s gripper, LEH series – Soft handling, gentle handling

So we adapt

Around half of the solutions SMC supplies into this sector involve some form of special or customised approach. That doesn't mean we automatically reach for something bespoke. Quite the opposite. We always look first at what's possible with standard solutions. But if some adaptation is necessary to make an automated process reliable, that's where our application knowledge pays dividends.

Let's solve the problem

There's a phrase we use internally that sums up our approach: **we never say no.**

It doesn't mean we promise the impossible; it just means we don't start a conversation by looking for reasons why something can't be done.

Instead, we ask questions. What are you trying to achieve? What's stopping you today? What does the process look like? What happens if we change this? Could we approach it differently?

Sometimes the answer comes from our extensive range of automation technology. Sometimes it involves adapting a standard solution. And sometimes it can even mean developing a new product.

The important thing is that we stay open-minded

That's why we like involvement at application level. Getting to grips with what's happening on the ground builds our comprehension. And we've built very long-standing customer relationships as a result, some going back more than 20 years.

What's coming next?

If you think CEA is already highly automated, just wait. Robotics is becoming an increasingly important part of the picture. Developments in robotics that can replace monotonous and repetitive manual tasks, such as leaf removal and harvesting, are currently very much in the spotlight. But robotics in a greenhouse isn't the same as robotics in a factory. The terrain can be uneven, plants aren't identical and every growing facility can be different. And then there's vision.



Vision technology is developing incredibly quickly, with sophisticated cameras and software able to build detailed 3D representations of plants in a split second. It opens up fascinating possibilities for robots. If a system can identify the exact position of individual fruits, leaves and stems instantly and accurately, it can make far more informed decisions about how to act.

CEA isn't standing still. Machine manufacturers and growers know that continued investment and innovation are essential to remain competitive. Automation can help them cut costs and reduce reliance on manual labour.

Ultimately, because every application is different, the best solution doesn't always come from a catalogue. It's therefore very important to sit down face to face with the client during the development process, where SMC products and partnership expertise come together.