The threaded studs for the junction boxes before assembly.
be either firmly attached or be an integral part of the junction box.

Before, the regular attachment process was done manually. Junction boxes were transported to a workshop, the studs were inserted and then the box went into a press that deformed the base of the studs in order to hold them in position. Finished products were then transported back to the factory. This was a time-consuming process, output was constrained, and lots of kilometers were clocked.

When the new model was being designed, the company decided to keep the whole process in house, thereby removing the production constraint and reducing the impact on the environment. However, using a robot to insert the studs into the mould and making them an integral part of the finished product was not something that the company had done before and the process had to be up and running in nine weeks in order to deliver on time.

“The combination of a brand-new application and a tight deadline was a significant challenge,” says ABB Ede project engineer René Wienholts. “At the beginning of 2007 we had commissioned Rokoma to deliver a turnkey, 6-axis solution for a packaging application that went well, so we engaged the same systems integrator. The solution was delivered on time. We’re running the insert application round the clock and producing about 3,000 junction boxes a day. If we’d stayed with the manual process the equivalent figure would be 500 a day.”

The new process involves a vibration table that puts the studs into position so that the robot can pick them up and insert them into the mould. Placement accuracy is a few hundredths of a millimetre. Injecting the plastic and waiting for it to cool down takes around 25 seconds. When finished, an IRB 1600 robot removes the junction box and drops it into a cardboard container. The robot is therefore idle for long periods of time, so it could produce another product if there were two, parallel injection moulding machines, i.e. the robot would switch from operating from the left to the right and back again. This is a logical next step that the company is considering.

The packaging application was implemented in early 2007. It involves separating small junction boxes and arranging them into a 2 x 5 array, which is subsequently transported into a machine where they are shrink-wrapped. The package then receives two identification labels and finally it is placed into a cardboard container.

The best out of robots
For ABB Ede, using a 6-axis IRB 1600 robot provided several important benefits:

• Production of junction boxes produced increased from 500 to 3,000 a day
• Flexibility of robot allows for possibility of using it for other simultaneous applications
• Less logistical headache by bringing the entire production in-house
• Lower environmental impact due to no longer shipping parts for manual production to other facilities and then back again for completion