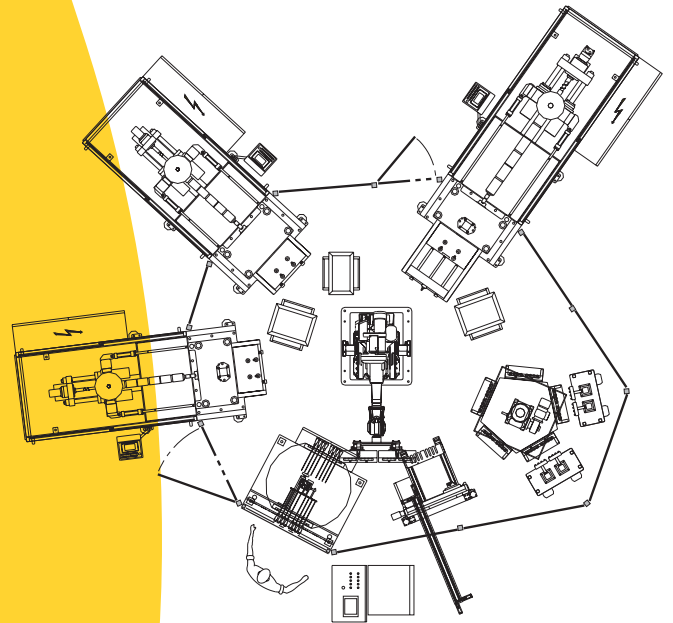


P3C

Multi-station Production Cell



presma
SPA
Injection Moulding Machines

Via delle industrie, 8/10 - C.P.25
21040 Torba di Gornate Olona (VA) Italy
Tel. +39 0331811611 - Fax +39 0331820026
Internet <http://www.presma.it>
e-mail: info@presma.it

**Non Standard
Technology**



Presma multi-station production cell is ideal for multi-component insert moulding

Flexibility through separate stations for moulding each component, cooling, insert loading and final part inspection

Specialist injection moulding machine maker PRESMA proposes a multi-station production cell for sets of screwdrivers and hand tool in general with soft-grip handles. The cell, which has a six-axis ABB articulating robot at its centre, has three separate injection units for moulding three different materials in eight-cavity moulds, as well as a preform cooling station. Further stations are used for insert loading and finished part unloading, for the part printing and for automatic insertion of metal caps.

The main advantage of the cell is that it can be used to make thick-walled parts at high rates, since cooling time is uncoupled from overall cycle time. Preforms are placed in a particular air cooling station (not in water) before being over-moulded.

Design aimed at cost-effective production

Each horizontal injection machine has a vertical clamp with a clamp force of 1500 kN. The lower mould platen is on a shuttle table to facilitate loading and unloading, while a hydraulic cylinder under the table drives the movement of the upper platen. Moulds are relatively low cost, since they use cold runners.

Injected parts are moved from one station to another by the robot, which has two end-of-arm tools (EOATs) that clamp onto special metal cassettes holding the screwdriver shafts. An operator loads the shafts into the cassettes and also unloads and inspects the finished screwdrivers, but everything in between is entirely automatic. Depending on the screwdriver model, cycle times are between 50 and 70 s. The cassettes have quick-change inserts that enable screwdriver shafts of various diameters to be used. Cavities in the injection moulds are also easy to change; this is important, since production changes can be frequent. The cell proposed by PRESMA is intended to produce screwdrivers with three different handle sizes, and they are equipped with all the necessary tooling to make this possible. PRESMA has its own mould-making operation. The screwdriver handles are made in a combination of polypropylene and a thermoplastic elastomer. Sprues and runners are recycled straight after parts are removed from the moulds. When the robot takes the parts from the machine, it breaks off the gates of the injection system and drops it into a dedicated granulator. Cavities have submarine gating to facilitate separation of the parts from the runners without cutting. The regrind is fed directly back to the same machine.

Production cell lay-out

The first station of the cell is used for manual loading of the screwdriver shafts into the cassettes. The same station also acts as the unloading station for finished parts.

Once loaded, the robot locks onto the cassette and takes it to the first injection machine. It removes the cassette already in the mould that is holding shafts over-moulded with the first, core, material, and replaces it with the new cassette.

The robot takes the cassette holding the over-moulded shafts to the cooling station, a tower with more levels on each of the different faces.

The robot locates the cassette onto the cooling tower with the handles facing downwards. Once the cassette is in position, the tower rotates so that the newly installed cassette is positioned over a series of jets that blow cold air onto the handles.

The cooling tower can hold many cassettes, so at the beginning of a production run, the first injection unit runs through all the cycles to fill it up, before the robot starts transferring cassettes to the second injection station for over-moulding.

Once over-moulded with the second material, the parts are transported directly to the third injection station and over-moulded again, this time with the soft-grip thermoplastic elastomer.

Cooling times can be changed

The first injection shot that forms the core of the handle has the major weight. The subsequent over-mouldings weigh considerably less and have much lower wall thicknesses, so they do not need further cooling once they leave the mould.

However, the production cell could easily be reconfigured for production of other parts that require long cooling times for the second shot as well as the first. The robot can be easily reprogrammed to return the cassettes to the cooling tower a second time; no hardware modifications would be required.

Even humble objects like the screwdriver undergo frequent face-lifts, so the sort of flexibility that a rotary production cell offers is particularly advantageous.

The cell also contains a station where metal buttons can be inserted into the ends of the handles, after being removed from the cooling tower and before moving to the second injection station. This station could also be used for printing information onto the handle. In this particular cell, the processor is making screwdrivers with the information already laser-printed onto the shafts.

In completion, PRESMA has also supplied more traditional two-component machines for production of complementary products such as handles for pliers and scissors. It has delivered two types, one a classical design with a rotating mold, the other with two separate machines, with a robot moving parts from one to the other.

