

## Case Studies Window Sash Assembly Machine

***Our client manufactures custom made machines for different industries, this time he had a request to build a machine to make Sash Windows faster therefore reducing production costs***

The client wanted to speed up the assembly of Sash windows and to be able to assemble up to a 100 windows per hour.

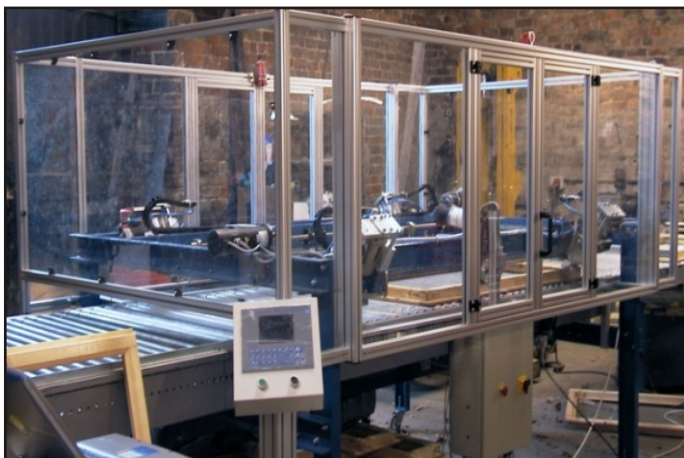
Using a 3 axis TRM motion controller with MAP software, 3 servomotors of 1.2 Nm each with 1000 ppr encoder, a TRM electrical cabinet, pre-made cables between the electrical cabinet and controller, 3 proximity sensors for home position and 2 beam sensors to detect the edge and size of each window we were able to build a machine that exceeded the job requirements. The machine is now assembling 120 sash windows per hour which is 4 times faster than without the machine when the production was 30 sash windows per hour.

The great advantage of this machine is its automatic window size detection and automatic setup to assembly the different window sizes which avoids the manual setup of the machine.

Today the user is manufacturing sash windows with better quality than ever and still remains competitive with labour costs down and increased production.



Photos courtesy of Bespoke Machines Ltd.  
[www.bespokemachines.com](http://www.bespokemachines.com)



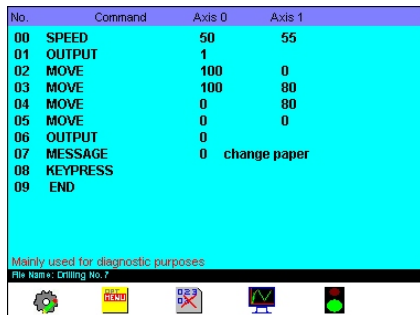
On the left, the Motion Controller operates the conveyor motor to feed the sash windows and using beam sensors (right hand picture) to detect the edge and size of the window. The controller will stop the conveyor in the required position, then will operate the servomotors to compress the window at the desired pressure. After the window is compressed, the controller will activate the outputs to fire the nails at 45 degrees.

The controller was programmed using the **Motion Application Programme 'MAP'**. 'MAP' has been used in a vast variety of machines and applications giving the user a greater control of costs, saving money and time on software development.



MAP is an end user friendly language adaptable for the majority of applications with 28 commands to choose from.

One of the great advantages of MAP is that it allows end users to create their own programs with no need for a skilled programmer. MAP has been used in different applications from Sash Windows Machines, Bowling Ball Machines, Tube Bending Machines, XYZ tables, Pallet Manufacturing Robots, rotary axes and milling machines to pharmaceutical mixers among other applications.



Program example using MAP. The controller can store up to 100 end user programs in memory with up to 1000 lines each.

## MOTION

### Point to Point move:

Moves a single axis from point to point with no acceleration, or velocity parameters. This command is mainly used by the profile generator or for holding position.

### Trapezoidal move:

Moves a single axis from point to point, using programmed acceleration and velocity parameters. If the velocity can not be reached the function will generate a triangular profile.

### Linear Interpolation:

This function allows up to 4 axis to be linked together to produce a linear profile. Full use is made of the acceleration and velocity parameters.

### Circular Interpolation

This function allows two axis to be linked together to produce a circular profile. Full use is made of the acceleration and velocity parameters.

## TYPICAL APPLICATIONS

- XY Positioning Tables
- Conveyors
- Dosing
- Mixers
- General Motion Control
- Cutting Machines
- Automatic Drills
- Positioners
- Robotics
- Bending Machines
- Woodworking Machines

## Items Provided By TRM for this Application

### Professional Motion Controller

1 off 3 Axis stand alone motion controller with keypad and colour screen.



### Electrical Cabinet

The TRM Electrical Cabinet is intended to simplify wiring. The Electrical Cabinet provides:

- 24 Volts for the motion controller and the power supply for the DC servo amplifiers to run the motors using an external transformer.
- Screw connectors are used for connecting the Inputs/Outputs for a fast connection
- On-board filtering of power supplies and signals



### Servomotor

3 off Servomotors rated at 1.2 Nm and at 60 V



### DC Servo-Amplifier

3 off compact current mode amplifiers capable of driving brushed DC Servo motors continuously at up to 100 volts and up to 5, 10 or 20 amps depending on the model



### Encoder

4 off Digital rotary encoders with 1000 ppr



### Sensors

3 off Inductive Proximity sensors for home position and 2 infrared beam sensors for detecting the size of the window

