

Case Studies

Food Depositor Machine

TRM help a food machine manufacturer to automate a depositor machine by using a 3 axis motion controller with colour screen and keypad

TRM specialises in helping machine manufacturers to automate machines and reduce production costs by offering them a complete control solution that will keep them ahead of their competitors.

Our customer wanted to build a machine that would automate the process of making a variety of bakery products with different sizes and shapes.

Our customer designed the machine and wanted our help in the design of the control system that would be integrated into the machine.

Using a 3 axis TRM motion controller custom designed software, 3 servomotors with servo drives, each with a 1000 PPR encoder, a TRM interface board, and a set of pre-made cables between the interface board and the controller we build a complete control system capable of controlling the whole machine and at a fraction of the cost of controllers found on the market.

One of the advantages of our system is that we designed the Motion Controller, PLC and HMI into the same enclosure which beside simplifying connections brings down costs.



Photo of the dough depositor machine with the TRM 3 axis motion controller & HMI.



Photo of the TRM 3 axis motion controller placed into the machine console

How the machine works

The 3 axis motion controller controls 3 servomotors by using the industry standard +/-10 V. The servomotors are used for:

- ✓ Moving the conveyor forwards and backwards
- ✓ For moving the conveyor table up and down
- ✓ For the dough depositor

The controller already comes with pre-loaded "recipes" from where the user can make different shapes and sizes of bakery products. The user can also create their own bakery products by using the programming capabilities of the controller. The graphic display shows quality images of the products and prompts the user when modifying the size and shape of any product.

SOFTWARE

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.

No.	Command	Axis 0	Axis 1
00	SPEED	50	55
01	OUTPUT	1	
02	MOVE	100	0
03	MOVE	100	80
04	MOVE	0	80
05	MOVE	0	0
06	OUTPUT	0	
07	MESSAGE	0	change paper
08	KEYPRESS		
09	END		

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
- ✓ 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 at 60 V



DC Servo-Amplifier

3 off compact current mode amplifier 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

3 off Digital rotary encoder with 1000 ppr.



Sensors

3 off Inductive Proximity sensors for home position.

