TRM International

Motion Control & Automation Manufacturers

Case Studies

Milling Machine Retrofit

Our client wanted to upgrade their milling machine to be faster and more precise but also to take advantage of modern CAD/CAM methods.

This second hand milling machine did not have a controller and its only automated equipment was a digital read out (DRO) and the linear encoders for X and Y axis.

Using our 2 axis motion controller, 2 servomotors, 2 DC drives and 2 encoders, electrical cabinet, toothed pulleys and belts and our own software MAP we upgraded the milling machine for a fraction of the cost that it would have been using a CNC controller system. This is an ideal solution for upgrading milling machines that need a quick set up time between jobs but still need faster production than manual operation. The machine is used for manufacturing different sizes of motor brackets and aluminum cases for electronic equipment.

The installation was quick and easy thanks to our pre-made wires and connectors. Once the toothed pulleys, servomotors and electrical cabinet were in place the job was almost done. After plugging all the cables into the electrical cabinet the machine was ready for the initial software parameters to be setup on our Motion Application Programme 'MAP'.

Milling machine with a 2 axis TRM Motion controller

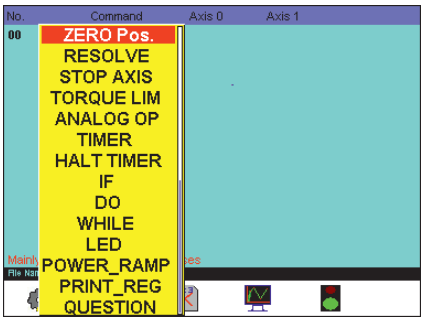
Parameters setup

MAP is very simple to install and few parameters have to be entered to ensure the accuracy of the system. Some of these parameters are the number of encoder pulses per revolution (PPR), number of encoder pulses per meter of travel per axis (this depend of the PPR and the gear ratio used), maximum and minimum speed, assignable inputs and 2 filters to ensure the stability of the system. This normally does not take more that 30 minutes after which the machine was ready to start production.

MAP can store up tp 100 different jobs in memory and as in any machine too it takes some time toset up but once it is done the machine executes the jobs much faster than manual operation, it means that few weeks later the machine had recovered the investment and was able to manufacture more pieces in a fixed period of time.

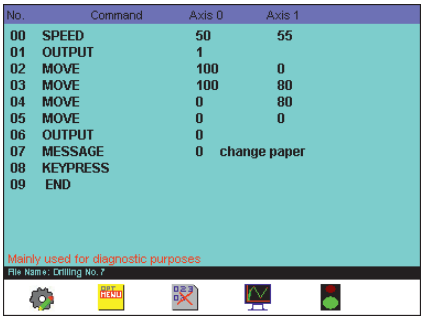
SOFTWARE

The controller was programmed using the **M**otion **A**pplication **P**rogramme '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.

MOTI ON

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 2 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
2 off Servomotors rated at 1.2 Nm and at 60 V

DC Servo-Amplifier
2 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
2 off Digital rotary encoder with 1000 ppr

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

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